National Library
of Canada

Canadian Theses Service

Ottawa, Canada
K1A 0N4

Bibliothèque nationale
du Canada

Service des thèses canadiennes

NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30, and subsequent amendments.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30, et ses amendements subséquents.

NL-339 (r. 88/04) c

Canada

National Library of Canada
Canadian Theses Service
Ottawa, Canada
K1A 0N4

Bibliothèque nationale du Canada
Service des thèses canadiennes

The author has granted an irrevocable non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of his/her thesis by any means and in any form or format, making this thesis available to interested persons.

The author retains ownership of the copyright in his/her thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without his/her permission.

L'auteur a accordé une licence irrévocable et non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de sa thèse de quelque manière et sous quelque forme que ce soit pour mettre des exemplaires de cette thèse à la disposition des personnes intéressées.

L'auteur conserve la propriété du droit d'auteur qui protège sa thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

ISBN 0-315-55405-3

Canada

University of Alberta

THE PSYCHOPHYSIOLOGICAL EFFECTS OF BACK MASSAGE IN ELDERLY INSTITUTIONALIZED PATIENTS

by

Joy Helen Tough ©

a thesis

Submitted to the Faculty of Graduate Studies and Research
In Partial Fulfillment of the Requirements for the Degree
Master of Nursing.

Faculty of Nursing
EDMONTON, ALBERTA

Fall 1989

THE UNIVERSITY OF ALBERTA

RELEASE FORM

NAME OF AUTHOR: JOY HELEN TOUGH

TITLE OF THESIS: THE PSYCHOPHYSIOLOGICAL EFFECTS OF BACK MASSAGE IN ELDERLY INSTITUTIONALIZED PATIENTS

DEGREE: MASTER OF NURSING

YEAR THIS DEGREE GRANTED: 1989

Permission is hereby granted to THE UNIVERSITY OF ALBERTA LIBRARY to reproduce single copies of this thesis and to lend or sell such copies for private, scholarly or scientific research purposes only.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

(Student's signature)

K4 Garden grove
(Student's permanent address)

Edmonton, alberta

Date: October 11, 1989

"Touch is glorious. and perfecting
it can be
a life's work.

(Cohen, 1987)

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "THE PSYCHOPHYSIOLOGICAL EFFECTS OF BACK MASSAGE IN ELDERLY INSTITUTIONALIZED PATIENTS" submitted by JOY HELEN TOUGH in partial fulfillment of the requirements for the degree of MASTER IN NURSING.

Janet C. Kerr
Supervisor

A. Neufeld

S. Hunka

Date: October 10, 1989

DEDICATION

To my children, for their support, encouragement, and patience.

To Shirley Sapara, for her assistance with the equipment and her support throughout the research.

To Lori Kashuba, for her support, encouragement, and friendship while I was writing.

To Ila and Leo, Maryann and Sabeth, for their friendship and support through the tough times.

To all the patients who participated in this study, for their enthusiasm, encouragement and generous sharing of their time so that others might benefit.

ABSTRACT

The purpose of this study was to examine the effects of back massage on anxiety levels in elderly institutionalized patients. It has been suggested that people in hospitals, particularly the elderly, may suffer from lack of human touch which is often replaced by technological measures. Back massage may offer many benefits to such patients, one of which may result in relaxation.

An experimental design was used, including three treatment groups of subjects receiving back massage with normal conversation, a group having conversation only, and a group receiving no intervention. Twenty-one elderly residents in an extended care center consented to participate in the study. Each subject was tested on the dependent variable anxiety before the treatment conditions were implemented, immediately after the treatment conditions were completed, and again ten minutes later. The treatments were given for four consecutive evenings to each subject.

The Spielberger Self-Evaluation Questionnaire (STAI) was used as a psychological measurement of anxiety levels prior to treatment and ten minutes following treatment. Physiological measurements of anxiety were obtained by electromyograph (EMG) recordings, systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR) immediately before, immediately after, and ten minutes following treatment.

It was hypothesized that the elderly who received back massage would demonstrate significantly greater immediate decreases in anxiety (EMG, SBP, DBP, HR and STAI) and significantly greater sustained reductions in anxiety than participants in the other treatment groups. An analysis of variance was used to examine the mean differences between groups from pre to post, post to delayed and pre to delayed time periods. Scheffé comparisons were subsequently made between main effects when indicated. The hypotheses were not statistically supported. A directional trend toward greater reductions in anxiety in the group receiving back massage compared to the group who had no intervention was noted. Positive subjective responses from back massage participants supports the use of touch and human contact in nursing.

The results of the study have implications for the basic practice of nursing, for nurse educators, administrators and nurse researchers.

ACKNOWLEDGEMENTS

I wish to acknowledge those individuals and organizations who assisted in the completion of this study. I would like to express my sincere appreciation and gratitude to the members of my thesis committee. To Dr. Janet Kerr, my thesis chairperson, thank you for your genuine interest in my topic, and your assistance and encouragement throughout the study. I would like to thank Professor Anne Neufeld for her participation on my committee and for the support she has provided me. I would also like to thank Dr. Steve Hunka for his assistance throughout the research, especially with the data analysis, and for his willingness to always make himself available when needed.

I would like to thank Bob McKim and Joyce Johnson for their interest in my project and for their support and frequent expressions of encouragement throughout.

I would like to express my sincere gratitude to Pauline Naykalyk for her secretarial assistance. Through her willingness to assist and work within short time limits, the thesis was prepared and printed.

I would like to express my gratitude to the following firms who provided the equipment that made this research possible: Wirtanen Electrical, Edmonton, Alberta; Critikon Canada, Inc., Markham, Ontario; and, Electromed Services, Edmonton, Alberta.

I would especially like to express my gratitude to Iain Miller for his invaluable assistance with the equipment and the computerization of the data. Through his enthusiasm, flexibility, and the generous donations of his time, the investigation and computerization of the data progressed smoothly from beginning to end.

Finally, I wish to thank the Alberta Foundation for Nursing Research for the student grant support they provided to assist in the completion of this research.

TABLE OF CONTENTS

CHAPTER PAGE

I INTRODUCTION AND STATEMENT OF THE PROBLEM 1

Problem Statement 1
Purpose of the Study 6
The Research Question and Hypotheses 7
Definition of Variables and Their Operationalization .. 7

II REVIEW OF RELATED LITERATURE 9

Introduction 9
The Nature of Anxiety 10
Measurement of Anxiety 11
Literature on Touch 14
Traditional Touch 15
Therapeutic Touch 19
Research on Back Massage 25
Conceptual Framework 30

III METHODS AND PROCEDURES 36

Design 36
Setting 38
Population, Sample, Sampling 40
Instruments 42
The Short Portable Mental Status Questionnaire 44
The Self-Evaluation Questionnaire, X-1 45
Physiological Measurements 48
The Dinamap™ Portable Adult/Pediatric and Neonatal Vital Signs Monitor 48
Electromyogram 48
Procedure 51
Preparation of Equipment and Sequence of Measurement .. 54
Treatments 56
Back Massage Treatment 56
Conversation-Only Treatment 57
No Intervention Group 59
Ethical Considerations 60
Data Analysis 61

IV RESULTS, DISCUSSION AND INTERPRETATION 63

Introduction 63
Hypothesis 1a 65
Electromyogram (EMG) Group Mean Scores 65

CHAPTER PAGE

ANOVA Results: EMG 70
Contrasts of Specific Means 73
Hypothesis 1b 75
  Systolic Blood Pressure (SBP) Group Mean Scores 75
  ANOVA Results: SBP 79
Hypothesis 1c 83
  Diastolic Blood Pressure (DBP) Group Mean Scores 83
  ANOVA Results: DBP 88
Hypothesis 1d 91
Heart Rate (HR) Group Mean Scores 93
  ANOVA Results: HR 97
Hypothesis 2 101
STAI Group Mean Scores 101
  ANOVA Results: STAI 105
Contrasts of Specific Means 105
Summary of the Results 108
Interpretation of the Findings 112

V CONCLUSIONS AND RECOMMENDATIONS 116

Conclusions 116
Limitations of the Study 117
Implications for Nursing 118
Recommendations for Further Study 120
Summary 121

REFERENCES 124

APPENDIX A 129

APPENDIX B 130

APPENDIX C 131

LIST OF TABLES

Table	Description	Page
3.1	Study Design	39
3.2	Summary of Personal Variables	43
3.3	Treatment Schedule for Participants	53
4.1	Anxiety Levels (EMG): Group Mean Scores	66
4.2	Anxiety Levels (EMG): Descriptive Statistical Results .	71
4.3	Anxiety Levels (EMG): Descriptive Statistical Results of Difference Scores	72
4.4	Anxiety Levels (EMG): Group Mean Difference Scores	72
4.5	Anxiety Levels (EMG) ANOVA Results: Pre-test to Post-test	74
4.6	Anxiety Levels (EMG) ANOVA Results: Post-test to Delayed Test	74
4.7	Anxiety (EMG): Scheffe Comparisons: Post-test to Delayed-test	74
4.8	Anxiety Levels (SBP): Group Mean Scores	76
4.9	Anxiety Levels (SBP): Descriptive Statistical Results .	80
4.10	Anxiety Levels (SBP): Descriptive Statistical Results of Difference Scores	81
4.11	Anxiety Levels (SBP): Group Mean Difference Scores	81
4.12	Anxiety Levels (SBP) ANOVA Results: Pre-test to Post-test	82
4.13	Anxiety (SBP) ANOVA Results: Post-test to Delayed-test	82
4.14	Anxiety Levels (DBP): Group Means Scores	84
4.15	Anxiety Levels (DBP): Descriptive Statistical Results .	90
4.16	Anxiety Levels (DBP): Descriptive Statistical Results of Difference Scores	90

4.17 Anxiety Levels (DBP): Group Mean Difference Scores 90

4.18 Anxiety Levels (DBP) ANOVA Results: Pre-test to Post-test 91

4.19 Anxiety Levels (DBP) ANOVA Results: Post-test to Delayed-test 91

4.20 Anxiety Levels (HR) Group Mean Scores 93

4.21 Anxiety Levels (HR): Descriptive Statistical Results .. 98

4.22 Anxiety Levels (HR): Descriptive Statistical Results of Difference Scores 99

4.23 Anxiety Levels (HR): Group Mean Difference Scores 99

4.24 Anxiety Levels (HR) ANOVA Results: Pre-test to Post-test 100

4.25 Anxiety Levels (HR) ANOVA Results: Post-test to Delayed-test 100

4.26 Anxiety Levels (STAI): Group Mean Scores 102

4.27 Anxiety Levels (STAI): Descriptive Statistical Results 106

4.28 Anxiety Levels (STAI): Descriptive Statistical Results of Difference Scores 106

4.29 Anxiety Levels (STAI) ANOVA Results: Pre-test to Delayed-test 107

4.30 Anxiety Levels (STAI) Scheffe Comparisons: Pre-test to Delayed-test 107

LIST OF FIGURES

Figure	Description	Page
2.1	Symbols of Touch in Relation to Tactile Integration	33
2.2	Conceptual Framework	35
3.3	Block Diagram of EMG Apparatus	50
3.4	Diagram of Measurement Apparatus	55
5.	Group Mean Anxiety Levels (EMG)	67
6.	Group Mean Anxiety Levels (SBP)	77
7.	Group Mean Anxiety Levels (DBP)	85
8.	Group Mean Anxiety Levels (HR)	94
9.	Group Mean Anxiety Levels (STAI)	103

CHAPTER I

Introduction and Statement of the Problem

The health care system is often criticized because of the depersonalization and dehumanization experienced by hospitalized patients. In the era of the ultrasound scanner and cardiac monitor, one major problem confronting nurses is the difficulty in maintaining the primacy of value placed upon the individual. With the emphasis on the technology of medicine, the client and the nurse may be robbed of a satisfying and effective caring/helping relationship. The desire for human contact which often motivates students to choose nursing, may have been lost in the move to specialization and high technology. From the patient's viewpoint nursing care has been viewed as fragmented, and lacking in continuity and compassion.

Because of the environment of care and procedures employed, hospitalization can threaten the patient's psychological well-being in terms of the need for identity and self-concept. Jourard (1964) wrote that when body image deviates from normal, the individual experiences anxiety, insecurity and lowered self-esteem. Hospitalization or institutionalization, can affect the basic needs of a person by causing depersonalization, withdrawal and sensory deprivation. According to Barnett (1972), the effects are anxiety-provoking, and anxiety is one of the most common and strongest responses of the patient to illness and hospitalization.

In his book Megatrends (1982), Naisbitt warned that "we must learn to balance the material wonders of technology with the spiritual demands of our human nature".. (p.40) because..."when high tech and high touch are out of balance an annoying dissonance results" (p.44). Sims (1986), echoed these same sentiments when she suggested that anxiety associated with the stress of hospitalization and the potentially dehumanizing effects of increased technology, must be counter balanced by interventions which involve caring, touch, and human contact. However, Dimond (1980), and Goodykoontz (1979), suggested that attitudes of nurses may influence care-giving and affect the expression of human touch. This relationship has also been demonstrated in nurses' interactions with elderly patients (Barnett, 1972). It has been observed that the elderly are the most deprived of touch and human experiences, especially if their lives consist of impersonal care in nursing homes and, involve separation from loved ones (Barnett, 1972; Burnside, 1981; Hollinger, 1980; Huss, 1977; Watson, 1975).

Touch is referred to as the overt expression of closeness, intimacy and sexuality (Fitzsimons, 1983). In cases where sensory opportunities decrease and direct sexual experiences diminish or cease, "tactile hunger" becomes a reality, and touch becomes especially important. In the elderly, diminished visual and auditory perceptions lessen the opportunity for environmental stimulation at a sensory level. Also, changes in body image may heighten the need for psychosocial stimulation. If nurses neglect to touch elderly patients, they may actually give rise to, or reinforce feelings of lack of self-worth and hence, they may increase or produce anxiety by inferring that the elderly are unattractive and undesirable. On the other hand, by incorporating touch into patient care, nurses can provide calming, soothing and reassuring signals to patients.

As a communication tool, touch, like a telegraph wire, is a conductor of a message. Used appropriately in nursing, touch can convey concern, and at the same time, be a tool for carrying out important skills such as 'skin massage' (Hardy, 1975). Hardy professes that a back massage and the accompanying emotional and social benefits which ensue can be the number one key to effectively treating a person as a whole.

It is generally agreed that nurses use back massage for two main purposes - to stimulate circulation to tissues and to provide a sedative, relaxing effect for patients. Psychological, mechanical, physiological and reflexive effects of massage have been attested to by physicians, physical therapists and nurses (Downing, 1972; Hardy, 1975; Holmes, 1986; Michelesen, 1978; Skull, 1945; Temple, 1967; Wood, 1974). Back massage, though it involves a technical skill, is therefore believed to have effects that go far beyond the procedure itself.

Although references to touch as a nurturing and therapeutic tool are repeatedly seen in the literature, there is little evidence that nurses seriously consider the benefits of touch in the form of massage, or use it in everyday practice. Elizabeth Hampton Robb wrote in 1910 that:

> It is not only desirable but absolutely necessary that nurses should have a good general knowledge of the principles of massage, its physical and physiological effects and its general application, because such knowledge will enable her to do much for the relief and comfort of almost any kind of patient. (p. 531)

In reviewing the literature, however, one is impressed by the dearth of nursing research that might substantiate the effects of this time-honored procedure which is fundamental to the practice of nursing. Yet touch in any form involves both the person being touched and the one doing the touching and it is known that something beneficial can happen to both people (Ashton, 1984; Ernst & Shaw, 1980; Hardy, 1975; Zefron, 1975). This has implications for a health worker's survival in a setting where stress and job turnover are high.

Problem Statement

Attempts are being made in nursing to shift the emphasis from a strictly medical, disease-based focus to a more holistic approach in which physiological, psychological and social needs of the patient are recognized. However, there is much evidence of the "touch-me-not" syndrome in the modern health care system where there is an adulation of things mechanical, synthetic, and frequently anti-human in nature (Krieger, 1975). The therapeutic use of hands is considered to be a universal human act, but it appears to be an act all but forgotten in this scientific age.

It has been stated that intimate contact through touch between the patient and nurse at the bedside, has an intrinsic effect upon the well-being of the patient (Sandroff, 1979). However, if nurses are to touch appropriately, or more freely, they must be convinced of its usefulness (Mercer, 1966). For example, nurses may assume they are merely stimulating circulation and that the patient is soothed and comforted when giving a 'back rub'; however, there may possibly be a greater effect than perhaps is realized. It is possible too, that nurses may not be convinced that there are any potential benefits of back massage.

It has been long recognized tht 'no drugs can accomplish the purposes of massage' (Skull, 1945), particularly in certain cultures. For example, the Greeks, Romans, Hindus, Chinese, and Japanese continue to value massage and consider it essential for health maintenance and preventative medicine (Box, 1984; Burton & Heller, 1964; Zefron, 1975). However, western societies seem to have developed taboos against touching and particularly against massage as a legitimate form of treatment. In nursing there has been an unwritten law which prohibits touching between patients and psychiatric nurses, largely associated with the psychiatrists' attitude of touch avoidance (Schmal, 1965). This attitude may be due in part to such things as 'the scandals of massage' (Report of the Special Commissioners of the British Medical Journal, 1894) from the last century and to the fact that the 'laying on of hands' has sometimes fallen into the wrong hands.

Fortunately there appears to be a renewed interest in the use of touch and massage in nursing and a renaissance of one of the oldest of healing arts seems to be taking place. There have been some attempts made to examine the effects of back massage, but the determination of the inherent value of this procedure has been largely based on qualitative observations and subjective reports. It is incumbent upon nurses to further substantiate the benefits of this important aspect of nursing practice through the application of more rigorous scientific methodology.

Purpose of the Study

The purpose of this study was to provide an empirical evaluation of the psychological and physiological effects of back massage. While it is acknowledged that there may be a number of different effects, the specific objective here was to evaluate the effects of back massage on anxiety. It is intended that the findings will contribute to nursing knowledge and practice. The research focuses upon an element of nursing which is practice-oriented, universal and basic to the nurse-patient relationship. Further, back massage represents a procedure which has historically been valued and used by nurses as an integral part of nursing care. It is also one that nurses by virtue of their profession, have been granted permission, and indeed, are expected to use.

The Research Questions and Hypotheses:

The following questions were addressed using a combination of psychological and physiological indices:

1. Does back massage lower the anxiety level of elderly institutionalized patients?
2. Does back massage have a sustained relaxation effect on elderly institutionalized patients.

The research hypotheses were formulated as:

1. Elderly patients receiving back massage will indicate significantly lower levels of anxiety than either those who received conversation only or those who had no intervention.
    a) Elderly patients receiving back massage will demonstrate a greater decrease in electromyography readings than either those who received conversation only or those who had no intervention.
    b) Elderly patients receiving back massage will display lower systolic blood pressures than either those who received conversation only or those who had no intervention.
    c) Elderly patients receiving back massage will display lower diastolic blood pressures than either those who received conversation only or those who had no intervention.
    d) Elderly patients receiving back massage will display lower heart rates than either those who received conversation only or those who had no intervention.
    e) Elderly patients receiving back massage will have a greater decrease in STAI scores than either those who received conversation only or those who had no intervention.
2. Elderly patients receiving back massage will demonstrate a greater sustained relaxation response following treatment than either those who received conversation only or those who had no intervention.

Definitions of Variables and Their Operationalization

For the purpose of this study, the following terms pertaining to anxiety and back massage are defined as follows:

Dependent Variable: Anxiety - A-state anxiety is a transitional emotional state that fluctuates and varies in intensity over time (Spielberger, 1966). A-state anxiety was measured by the self-evaluation questionnaire, Form X-1 (in appendix B), developed by Spielberger, Gorsuch and Lushene (1970). Other indicators of anxiety which were utilized were blood pressure, pulse and electromyogram readings.

Independent Variable: Back massage - Effleurage, or massage using long, firm, slow-stroking motions was used as described and recommended by Downing, 1972, Hardy, 1975, Longworth, 1982, Sims, 1986, and Temple, 1967. Wood's (1974) components of massage were incorporated into the technique using baby oil as a lubricant. (See complete description under procedure).

This chapter has outlined the problem in relation to the use of touch and particularly the apparent lack of knowledge surrounding the benefits of massage in nursing. Subsequently the purpose of the present study, the research question, and hypotheses and definition of variables was given. The following chapter includes a review of related literature and a description of the conceptual framework upon which this study was based.

Chapter II

Review of Related Literature

Introduction

This chapter includes a review of the literature on anxiety, touch and back massage. Here the focus is on research related to these areas, and where applicable, theoretical/conceptual literature is addressed. The conceptual framework for the study is described at the end of the chapter.

Historically, touch has been intimately associated with fundamental procedures and practices in nursing. As alluded to earlier, when touch is introduced consciously and appropriately into nurse-patient interactions, it may facilitate the communication process, decrease levels of anxiety and reinforce a component of security and warmth in the dyadic relationship (Barnett, 1972b; McCorkle, 1974; Rubin, 1963; Weiss, 1979). Since back massage is a form of touch, often referred to as an example of instrumental touch (Watson, 1975) or task-oriented touch (Burnside, 1981), an examination of the literature on touch was carried out. This review is presented following an elucidation of the concepts of anxiety and the measurement of anxiety levels. Research on back massage follows the above discussion.

The Nature of Anxiety

Two distinct forms of anxiety, trait anxiety and state anxiety, have been identified by Cattell and Scheier (1961). Trait anxiety is defined as a relatively permanent and stable characteristic and state anxiety as a transitory condition which varies over time. Spielberger (1966, 1972) maintained the distinctions between trait and state anxiety and further defined state anxiety (A-state) as a complex emotional reaction "consisting of unpleasant consciously-perceived feelings of tension and apprehension, with associated activation or arousal of the autonomic nervous system (1972, p.29).

The postulate that anxiety is related to a heightened arousal state was put forward by Malmo (1957). Researchers have since agreed that anxiety represents a high state of arousal on an arousal continuum, with relaxation being at the lower end of the continuum. Arousal is not seen simply as a single response continuum, but as one with cognitive, attentional, emotional, somatic and autonomic components (Brown, 1977; Schwartz, 1977). Consequently, it is possible to regard psychophysiological measures as reflecting the level of arousal and hence the intensity of an effect such as anxiety (Lader, 1967). The concept of arousal within this framework serves as an intermediate state between physiological signs and characteristics and the concomitant emotion. Anxiety can be envisioned as accompanying a rise in arousal level, and hence of a particular psychophysiological parameter.

The construct of anxiety has been extensively studied from many theoretical perspectives, but, regardless of theoretical orientation it is recognized that anxiety is both psychological and physiological in nature. Research suggests the evidence of a positive relationship between the psychological and physiological correlates of anxiety (Haynes, Moseley, McGowan, 1975; Lader, 1967; Malmo and Shagass, 1949; Smith, 1972; Smith, 1973)

It would seem, then, that anxiety levels may be assessed through either introspective self reports or physiological measures. However, the literature on anxiety suggests that anxiety levels can be most meaningfully defined by assessing a combination of the two (Lader, 1967; Spielberger, 1972). Indeed, it would be fallacious to assume that high levels of physiological activity are always an index of anxiety. Increased physiological activity may in fact be due to increased physiological needs or to emotional states other than anxiety. Thus, other validating criteria must be utilized; namely the patient's subjective report.

Measurement of Anxiety

Since anxiety is an abstract psychological construct, efforts to assess it include clinical evaluation and introspective self reports from patients. Reported reliability and validity data from instruments suggest that these are useful and acceptable measures of anxiety (Cattell and Sheier, 1963; Martuza and Kallstrom, 1974; Spielberger, Gorsuch and Lushene, 1970). Also, it is generally agreed that there are a number of physiological changes accompanying anxiety (Boguslawski, 1979; Malmo, 1957; Stoyva and Budznski, 1974;

Wolpe, 1969). These changes are increased heart rate, skin conductance, respiration rate, blood pressure and muscle tension levels. Increased muscle tension is one of the more commonly recognized components of an anxiety response.

Indeed, Reinking and Kohl, (1975) claim that muscle activity is the best physiological correlate of anxiety. Balshan, (1962); Haynes, Moseley and McGowan, 1975); Wilkinson, (1978) provide evidence of a positive relationship between anxiety and muscle tension, and it appears that electromyography can be used to reliably measure anxiety through muscle tension. Although any accessible muscle group can be monitored, and some researchers suggest recording from several sites (Lader, 1967), electromyograph recordings of the activity of the frontalis (forehead) muscle is said to be the more reliable indicator of muscle tension (Grossman and Weiner, 1966).

Just as certain parameters are indicative of high levels of anxiety or high arousal states, low levels of anxiety or low levels of arousal are characterized by certain psychological and physiological changes. Decreased oxygen consumption, heart rate, respiratory rate, arterial blood lactate, increased skin resistance and temperature and reduced muscle tension indicate decreased anxiety (Benson, Beory and Carol, 1974; Benson, Rosner and Marzetta, 1974; Lader, 1967). This series of physiological changes was described by Benson, et al. (1974) as the relaxation response. Longworth (1982) presented a comprehensive review of different parameters used to measure the response to relaxation techniques. Blood pressure (BP), heart rate (HR), skin temperature (ST), galvanic skin response (GSR), surface electromyography (EMG), and electroencephalogram (EEG) have been used in various combinations in several studies on anxiety and relaxation techniques. Behavioral techniques such as meditation, yoga, biofeedback and progressive relaxation have been most widely studied as techniques to lower anxiety and tension (Benson, et al., 1974; Borovec and Fowles, 1973; Patel, 1975; Jacobson, 1939; Jacobson, 1940). On the other hand, sensory integration techniques which include the use of sensory modalities (touch, auditions, revision, perception) have received less attention as relaxation techniques.

Research indicates that relaxation techniques may be successful in decreasing anxiety; however the lack of consistent parameters to measure arousal levels or anxiety and the effects of relaxation makes it difficult to compare finding of different studies. Even if effective, certain techniques such as progressive relaxation, biofeedback and yoga, may require considerable training for the patient as well as the therapist. Such techniques may not be appropriate, especially for use with an elderly population. In nursing, those techniques which are easy to administer and which require little additional training would seem more appropriate. In this light, touch, a well known and intrinsic element of nursing, is examined in terms of its relationship to anxiety.

Literature on Touch

The concept of touch has been of interest to many disciplines and professions, and over the past several years the health care literature has been replete with articles on touch. Montagu (1971), in his book Touching: the human significance of the skin wrote about how tactile experience or lack of it, affects the development of behavior. Through research and cited studies, he drew attention to the relationship between cutaneous stimulation and the development of the sustaining systems of the body. Barnett (1972) presented a schematic representation of Montagu's description of the need for touch as follows:

$$\frac{\begin{array}{c}\text{physiological}\\ \text{tension}\end{array}}{\text{general tension}} = \begin{array}{l}\text{urge}\\ \text{or need}\\ \text{to be}\\ \text{caressed}\end{array} = \begin{array}{l}\text{which}\\ \text{leads to}\\ \text{the act}\\ \text{of contact}\end{array} = \begin{array}{l}\text{homeostasis}\\ \text{(soothing}\\ \text{affect)}\end{array}$$

Underscoring Montagu's work was his emphasis on the importance of touch for human growth and development throughout life. This has also been suggested by Bowlby (1958) and Frank (1957). Jourard (1964) has also demonstrated that deprivation in terms of touch has been correlated with difficulty directing thinking, anxiety and distorted perception.

The nursing literature on touch offers a number of facets which have been studied. The effects of touch (Aguilera, 1967; Krieger, 1975; McCorkle, 1974; Rubin, 1963); theoretical concepts (Barnett, 1972; Dominion, 1971; Morse, 1983; Weiss, 1979); guidelines for use in a variety of settings (Burnside, 1973; Durr, 1971; Johnson, 1965; Preston, 1973); touching behaviors of intensive care nurses (Estabrooks, 1987); and student reactions (Aguilera, 1967; Amacher, 1973; Johnson, 1965) have been investigated. Following is a review of the literature on traditional touch and therapeutic touch.

Traditional Touch

Touch is generally classified as instrumental or 'expressive' in the nursing literature, although there are various labels applied to each classification. Instrumental touch is defined as "deliberate physical contact initiated to facilitate the performance of another act that is the primary aim of the initiator" (Watson, 1975, p.104). Expressive touch is "relatively spontaneous and affective. It is not required or intended by the institutional relationship of the interactants" (Watson, 1975, p.104). An example of instrumental touch is touching required during treatments by nurses, such as washing patients or dressing a wound. This type of touch is also referred to as procedural (Goodykoontz, 1979) or task-oriented (Burnside, 1981). Expressive touching is often referred to as non-procedural (Goodykoontz, 1979), or affective (Burnside, 1981). Watson (1975) suggested that while the use of touch by health professionals is primarily instrumental in nature, any given instance of touching may have expressive as well as instrumental significance. Indeed, Burnside (1981) observed that there are times when both types of touching may occur simultaneously during nursing interventions.

It has been demonstrated that even though the elderly may benefit the most from touch, they may actually receive less expressive touch than do patients in younger age groups. Barnett (1979) surveyed the use of touch as a mode of non-verbal communication by 900 health care providers with 540 patients in a general hospital. It was found that patients in the 66 to 100 year-old group were touched the least frequently and those aged 26 to 33 were touched the most. When elderly patients were touched it appeared that touch occurred most often in an instrumental context. This was supported in a descriptive study (Watson, 1975) where it was observed that 68% of 187 occasions for touching geriatric nursing home patients were instrumental in nature. Factors found to be conducive to touching were an increased distance of body region from genital zones, same sex of patient and nurse, high social status of the initiator and the relative absence of physical impairment. The upper arm and back regions were touched most frequently. It was further revealed that males and severely impaired patients were likely not to be touched.

Huss (1977) emphasized the importance of touch for elderly patients and particularly those who are under stress, anxious or withdrawn. Aguilera (1967), Burnside (1973), and Preston (1973) stressed that, in a regressed patient, the inability to communicate leads to social isolation and that unless repeated contact is made through touch, withdrawal will continue. Burnside (1973) reported that elderly patients with chronic brain syndrome responded positively to touch, and noted an increase in appropriate verbal and non-verbal communication. When patients were touched, increased verbal interaction, rapport and approach behavior was observed in studies with other impaired elderly when touch was employed (Aguilera, 1967). Others have found a positive relationship between positive self-appraisal (Copstead, 1980) and increased attention (Langland & Panicucci, 1980) when touch was used with elderly confused patients.

In a study by deWever (1977), inconsistencies relative to perceptions of touch by nurses were noted among a group of elderly nursing home residents. These were described as either comfort-promoting or uncomfortable. A number of female residents were accepting of task-oriented touch, but did not like affective touching which was not associated with a part of their care. Others resented being touched by male nurses. Touching the arm or shoulder was uncomfortable for the greatest number of subjects. These findings contradict Hopper and McWilliams' (1967) recommendations that nurses put an arm around a patient's shoulders to convey emotional support to nursing home patients. The findings were also not congruent with the results of an exploratory study by Jourard (1966) in which cultural patterns for tactile interactions were revealed. It was suggested by Jourard's research that those areas which can be touched without personal connotations, and which will be acceptable are the back, shoulders and arms. However, Weiss (1979) contends that there are individual differences in interpreting the meaning of touch. It is essential, therefore, that though nurses, by virtue of professional status, have implicit permission to touch patients, they must be continually aware of potential differences in the nature of interpersonal touch. Nurses must be aware of how touching is perceived and what it means to different individuals to be touched.

In summary, upon reviewing nursing studies on touch, inconsistencies in the definitions of touch, areas touched and types of touch used made it difficult to satisfactorily compare results. Often small sample sizes and methodological weaknesses resulted in inconclusive or questionable results. However, there are indications that touch is a powerful communication tool, one that can provide comfort and emotional support. The nursing literature clearly does suggest that, despite the recognized need for touch, the elderly patient population does not receive adequate touching from nurses.

In the nursing research literature on touch, no studies were found where anxiety was examined as a dependent variable when traditional touch (other than back massage) was used as an independent variable. Some significant work that has been done involves studies of the effects of therapeutic touch. Although different from traditional touch used in nursing, therapeutic touch (TT) bears consideration here, as the majority of research on TT was conducted in relation to anxiety, and most studies involved the use of actual touch.

Therapeutic Touch

Therapeutic Touch (TT) was first described in the nursing literature by Krieger (1975). She describes TT as an act of helping or healing that is akin to the ancient practice of "the laying-on-of-hands." Those who promote TT claim that the hands are used to direct excess body energies from one person (healer) to another (healee) for the purpose of helping or healing an individual (Bulbrook, 1984; Krieger, 1975). During the process of TT the hands of the healer generally do not touch the healee but rather are moved continuously around the subject at four to six inches from the body.

Scientific research and documentation of the effects of TT are in the developmental stage, but several aspects of TT are addressed in the literature. The history of the laying-on-of-hands (Zefron, 1975); the theoretical framework within which to interpret TT (Miller, 1979); and mapping the human field (Boguslawski, 1979; Boguslawski, 1980) are discussed. Boguslawski suggests ailments which TT may ameliorate and Krieger (1975) describes a format for charting the effects of TT. However interesting these contributions are, they have not provided empirical support for practice, nor did early research studies on TT produce conclusive results. For example, well-designed, double-blind studies done on mice (Grad, Cadoret, and Paul, 1961) and on barley seeds (Grad, 1975; Smith, 1972) resulted in mixed findings concerning the effects of TT.

Krieger (1976) conducted the first nursing research on the effects of TT using hemoglobin levels as a dependent variable.

Although Krieger reported success of TT as a treatment to increase mean hemoglobin levels, her research has since been criticized. (Clark and Clark, 1984) cited methodological problems such as lack of random assignment to experimental and control groups, use of medications by some subjects, and inappropriate use of multiple t-tests, as weaknesses in Krieger's study.

Later research by Krieger, Peper and Ancoli (1979) demonstrated an attempt to provide evidence that TT can elicit a relaxation response. In a laboratory experiment, indexes of electroencephalography, electromyography, galvanic skin response, temperature and heart rate reportedly indicated a physiological relaxation response in individuals where TT was used. However, other than an informal subjective response, no psychological measurement of anxiety or relaxation was used.

Krieger's research was subsequently built upon by Heidt (1981) who attempted to examine the effects of TT on anxiety. The dependent variable in Heidt's study was state anxiety as measured by Spielberger's self-evaluation questionnaire (STAI) (Spielberger, Gorsuch & Luschene, 1970), administered pre and post intervention. Heidt's sample consisted of 90 volunteer cardiovascular patients who were aged 25 to 65, assigned to an experimental group, (therapeutic touch with contact) and two control groups - one which received casual touch and one which received no touch. Heidt reported that the therapeutic touch group had significantly lower anxiety scores following treatment than those in the control groups. Heidt presumably hoped to control for the placebo effect (of client expectations) by providing a control group which received casual touch. However, since the group did not receive the behavioral stimulation of the TT routine, and the TT group was also touched, she failed to clearly demonstrate whether the anxiety reduction reported was due to an hypothesized transfer of energy, to touch itself, or to the placebo effect. Using a control group which received a simulated therapeutic touch procedure (passing the hands over the patients' body without purposefully transferring energy) and one where no actual touching was done, would have more appropriately allowed Heidt to employ a double-blind procedure and thereby control more effectively for the placebo effect.

Surprisingly, although Heidt reviewed the literature that discusses the relaxation response manifested by changes in respiratory rate, heart rate, and blood pressure (Wallace, Benson and Wilson, 1971; Benson, Beary, and Carol, 1974), she did not include such physiological measures of anxiety in her research. Unfortunately, lack of physiological measures to corroborate the results of the anxiety questionnaire weakens the validity of her findings.

Quinn, (1983) replicated Heidt's study using the STAI and 37 volunteer cardiovascular patients, aged 36 to 81 years. Quinn replaced the casual touch with a form of what was termed 'placebo touch'; this was a simulation of TT without any energy transfer. She did not use a controlled group with no treatment. The TT group was given identical treatment to Heidt's except none of them had physical contact during the TT interventions. Quinn reported that the non-contact TT group demonstrated significantly lower anxiety scores than the non-contact placebo group. Comparing her results with those of Heidt, Quinn concluded that the effects of TT with contact (Heidt group) and the effects of TT with no contact on anxiety were the same, and therefore, physical contact was not important in explaining the effects of TT. Caution is necessary, however, in interpreting the findings without statistical analysis of the groups. The small samples in this study also make generalizability questionable. Like Heidt, Quinn neglected to use physiological measures to corroborate the results of the STAI questionnaire.

A further attempt was made to differentiate between TT and physical touch (Randolf, 1984) by measuring the physiological responses of 60 female college students to stressful stimuli. TT was used in the experimental group with the subjects' abdomens and backs being touched during the procedure while the control group received physical touch alone, which involved light placement of hands on the subjects' abdomen and lower back areas. Measures of physiological response were skin conduction, muscle tension, and peripheral skin temperature, selected as being indicative of central, automatic and peripheral nervous system function. The differences in physiologic responses between the two groups were not statistically significant, nor did the experimental group (TT) remain more relaxed than the control group (physical touch). One possibility is that actual touch could also provoke a physiological response which would mask any affect of TT. To control for that possibility a third group could have been subjected to therapeutic touch with no actual skin contact. Further, the use of an accompanying anxiety questionnaire would have provided an indication as to the subjective feelings of relaxation.

Using placebo TT (described by Quinn) as a comparison, Keller and Bzdek (1986) measured the effects of TT on tension headache pain. The McGill-Melzack Pain Questionnaire was used to measure headache pain levels before each intervention, immediately afterward, and 4 hours later. Tension headache was considered to be reflective of anxiety. Sixty volunteers (university students and white collar workers) were randomly assigned to TT or placebo touch groups. No physical contact was used with the groups. To rule out the effects of deep breathing used in TT both groups were asked to deep breathe during treatment. An average of 70% pain reduction was sustained over 4 hours following TT, which was twice the average pain reduction following placebo touch (37%). It was recognized that deep breathing can have an effect on tension headache pain; however, the base-line placebo effect and the contribution of rest and deep breathing were stabilized between the two groups, and there was still a statistically significant difference in the effectiveness of the two treatments. It is unfortunate that since this research was based on a relationship between pain and anxiety, physiologic measures of anxiety were not utilized in conjunction with the pain questionnaires.

In summary, the literature on therapeutic touch reveals conflicting and inconclusive results as to the benefits obtained. Studies which have been done to examine the effects of therapeutic touch on anxiety have relied on either physiological or psychological measurements alone. Though most researchers express the importance of a holistic approach to caring for patients, few have capitalized on indices that capture the interrelationship between psychological and physiological variables. The literature on anxiety and relaxation clearly suggests that the complex interaction of the various levels and structures of the central nervous system make it difficult to rely on any one index of arousal level. Therefore, several factors need to be measured and interpreted in order to produce reliable results. Thus far, the literature reveals that researchers in nursing have neglected to satisfactorily use corroborating physiological and psychological measures of anxiety in touch research. Though the research on therapeutic touch produced results which tend to demonstrate positive effects, without a broader assessment of variables, it may be presumptuous to teach the art or seriously discuss the use of this practice in the treatment of patients. It seems logical to conclude that until more is known about this modality, it will not be universally accepted. Further, even if TT is adapted as an intervention in nursing practice, it is important that nurses continue to utilize touch in traditional ways-ways that they have already been taught and which are an accepted part of nursing practice. A review of the research on one such method is presented below.

Research on Back Massage

Back massage or the "back rub" has long been used and has been advocated for its relaxing effects. It is a time-honored component of nursing measures to promote comfort. However, until the last few years, only three nursing research studies which examined the effects of back massage were found. Earlier, Kaufman (1964) and Barr and Taslitz (1970) conducted studies on the influence of back massage on autonomic functions. Measurements of arterial blood pressure, heart rate, galvanic skin response, peripheral skin temperature, pupil diameter and respiratory rate were used as measurements. No psychological measurements were utilized. These studies did not produce consistent findings.

In a more recent exploratory study (Longworth, 1982) psycho-physiological effects of back massage on relaxation were examined using 32 female volunteers. Independent variables were slow-stroke back massage and the length of time of administration (three minutes and six minutes). The dependent variable was anxiety, as measured by Spielberger's state-trait anxiety inventory (STAI), generalized muscle tension (EMG), heart rate (HR), systolic (SBP) and diastolic blood pressure (DBP), galvanic skin response (GSR), and finger temperature (ST). STAI scores decreased significantly after the massage, significant decreases occurred for mean SBP, and mean HR, mean GSR and ST during the baseline (resting) period. SBP increased during the first three minutes of massage and HR increased during the last three minutes of massage. GSR and ST decreased during the first three minutes and increased during the last three minutes. A significant increase in GSR and decrease in mean ST occurred during the final rest period. Mean EMG scores decreased throughout the study, with the only statistically significant decrease occurring in the final rest period.

Of interest is the fact that pre-massage and post-massage STAI scores did not correlate with other psycho-emotional indices of GSR and ST, and GSR and ST did not covary. This was seen by Longworth to support the idea that "various components of arousal (cognitive, attentional, somatic, and psycho-emotional) produce different response patterns for measures of skin conductance, anxiety and HR" (p.57). These results also demonstrate the importance of utilizing a variety of indices to measure psychophysiological responses.

In her comparison of three and six minute massages, Longworth observed the following: the three minute massage produced a significant increase in SBP, and nonsignificant decrease in HR and EMG; the six minute massage produced a significant increase in HR, increase in EMG (nonsignificant), decrease in SBP and DBP, increase in GSR and unchanged ST. Prolonged effects of back massage were examined in the ten (10) minute rest period following massage. Mean SBP, DBP and HR did not change significantly when compared to the rest period prior to massage. Mean GSR and ST increased significantly. EMG scores decreased significantly during the final rest period, indicating that the delayed effect of back massage was to lower generalized muscle tension. This effect was further validated by a significant decrease in STAI scores and contradicts Sister Regina Elizabeth's (1966) observation that the effects of slow-stroke back massage lasted for only three minutes. Longworth concluded from her findings that the psycho-emotional benefits of the slow-stroke back massage supported continued use of touch as a therapeutic modality for nurses.

Slow-stroke back massage was the independent variable in a pilot study conducted by Sims (1986). A small sample (6) of volunteers (patients with breast cancer) were randomly assigned to two groups; group I in which a 10 minute back massage was given for three days, followed by three days of a 10 minute rest period; and group II where massage and control interventions were reversed. To measure the effects of back massage on the perceived well-being of the patients, a Symptom Distress scale and a mood scale (using adjectives associated with high levels of physiological arousal - tension, fatigue and anxiety) were administered.

For patients in group I a statistically significant difference between experimental and control conditions was noted in symptom distress following massage. However, those in group II reported the same improvement following both massage and control interventions. There were no significant differences in total improvement in symptom distress following massage compared to the control intervention. Though the sample reported a trend towards overall mood improvement following massage (17.9% compared to 13.8% following control intervention), there was no statistically significant difference.

Sims suggested that the results of the study indicated that patients reported less symptom distress, a higher degree of vitality and less tension and tiredness following slow-stroke massage compared to the control interventions of lying down. Due to the small sample of volunteers, failure to consider other variables such as medication and amount of pain, and the lack of a control group receiving no intervention, the results of this study are difficult to analyze and must be interpreted with caution.

Longworth's design was replicated by Bauer and Dracup (1987) in an attempt to demonstrate the effects of back massage in patients with acute myocardial infarction. The convenience sample in this study consisted of 25 patients aged 37 to 76 years, with patients serving as their own control. No significant differences were found in premassage and post massage comparisons of EMG, galvanic skin response, skin temperature, heart rate or blood pressure. No formal subjective questionnaire was utilized, and although this finding was anecdotal and without a comparison group, when subjects were asked to describe their responses to the back massage, all but one reported pleasurable feelings from it. The researcher suggested "that the perception of comfort and relaxation reported by these subjects appears to be a true subjective experience" (p. 46), and the importance of this positive subjective response must not be disregarded.

The only study found in which subjects were elderly patients in nursing homes was one carried out by Fakouri and Jones (1987).

Utilizing the technique of slow-stroke back massage as described by Longworth (1982) and suggested by Sister Elizabeth (1966), it was hypothesized that a relaxation response would result. The sample in this study consisted of 18 nursing home patients aged 56 to 96, who received back massage for 3 days. Immediately before and after a three minute back massage, BP, P and ST measurements were obtained. Pulse and skin temperature were taken ten minutes after treatment. Mean differences between all of the physiological indicators were reported to be statistically significant ($\alpha \leq .05$), as were differences in heart rate and skin temperature before the back massage compared to ten minutes following. All changes suggested a relaxation response. Use of a psychological measurement to corroborate a reduction in anxiety would have strengthened the results of this study.

Unfortunately the lack of verification with subjective evidence, and the lack of a control group lead to inconclusive findings in Fakouri and Jones' study. The ability to generalize and compare results of this and other back massage studies is hampered by the variety of research methods and instruments used, by the lack of attention to establishing reliability and validity, and by variation in the type of massage, length of time and method of administration across studies.

In conclusion, despite concerns about methodology and generalizability, the results of the touch-oriented literature as it pertains to anxiety did provide some direction for the present study.

The research offers evidence that elderly patients are at risk of being deprived of touch and may suffer from sensory deprivation and anxiety which could be alleviated in part, by the appropriate use of touch by nurses. The touch literature indicates that a variety of types of touch may be beneficial if used appropriately, and that touch may decrease anxiety in elderly patients. To date most of the studies which described the effects of touching on anxiety are fraught with weaknesses due to the aforementioned use of unsophisticated methodologies, superficial analysis, and inattention to issues of reliability and validity. Further, the failure to use available instruments which provide reliable psychological measurements of anxiety has been a persistent problem.

Conceptual Framework

The conceptual framework for this research was constructed from an amalgamation of psychophysiological theories of anxiety, constructs of tactile integration, and principles of massage. According to Selye (1956) and Lader (1967) physiologic manifestations of stress or anxiety are triggered by the sympathetic nervous system and can be measured on a continuum as a reflected state of sympathetic nervous system arousal. Benson et al. (1974) defined relaxation as the opposite of arousal, with a subsequent decrease in sympathetic nervous system activity. Put simply, whereas anxiety may represent one of the many states on a continuum of arousal, relaxation would represent an opposite state on the continuum.

Physiologic measures reflect to a greater or lesser extent this level of arousal and the intensity of anxiety or relaxation engendered.

Merely being present and talking to patients may in itself have an effect on anxiety. For example, in an ethnoscientific analysis of comfort, Morse (1983), found that the major components of comfort were identified as touching and talking. She further found that each category of touch could be subdivided into the following segregates: the talking segregate contained sub-segregates of 'talking only' and 'talking/little touching/hugging' and 'touching/little-talking'. One of the conclusions of the study was that "comfort measures vary according to situations, context and meaning to each subject" (p.16). For example while those who are ill, sick or in pain may be comforted by touching with a little talking, talking alone is used when a person feels lonely or bored (as may be the case with elderly patients).

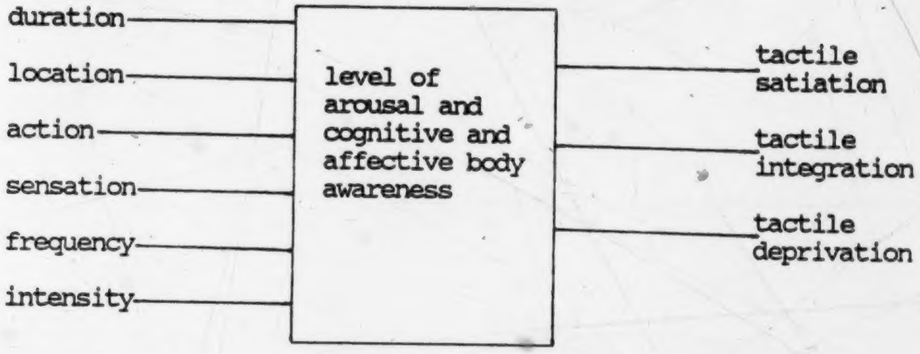
Frank (1957) also claimed that a person who is reacting strongly emotionally (as in fear, grief or anxiety) may relax through close contact with another sympathetic person. Montagu (1971) suggests too, that contact with another may produce a soothing, homeostatic effect when physiological or general tension is present. The mere presence of a supportive individual, according to Sivadon (1969) may relieve symptoms of anxiety and decrease levels of arousal. In other words, simply having someone to talk to may be a rival determinant of the dependent variable and therefore an extraneous variable that needs to be controlled.

Weiss (1979) incorporated neurophysiologic and sociophysiological theories into a framework of tactile arousal. She suggested that the effects of touch may also be exhibited on a continuum reflective of central nervous system activity, and experienced as neuromuscular excitations of the body. She further suggested that a certain level of arousal must be carried to the central nervous system for adequate cognitive and affective awareness of the body to occur. Weiss coined the phrase 'tactile integration' to describe the body's experience of an optimum or adaptive state on a continuum of tactile arousal. Tactile deprivation and tactile satiation are said to be at opposite ends of the continuum, with the first indicating a reduction in the level of overall tactile sensory input and the latter resulting in an overload of tactile sensory input. Weiss implies that nurses can increase physical and emotional adaptation of clients through touch.

According to the framework put forth by Weiss, the level of tactile arousal is determined by certain qualities of touch described as tactile symbols, which she claims create the language of touch. There are six symbols which are professed to define the act of touching as an independent channel of communication. The use of the symbols of duration, location, action, sensation, intensity and frequency are modifiers of the achievement of tactile integration during the touch experience. (Figure 2.1 provides an illustration of Weiss's framework).

Figure 2.1:

Symbols of Touch in Relation to Tactile Integration



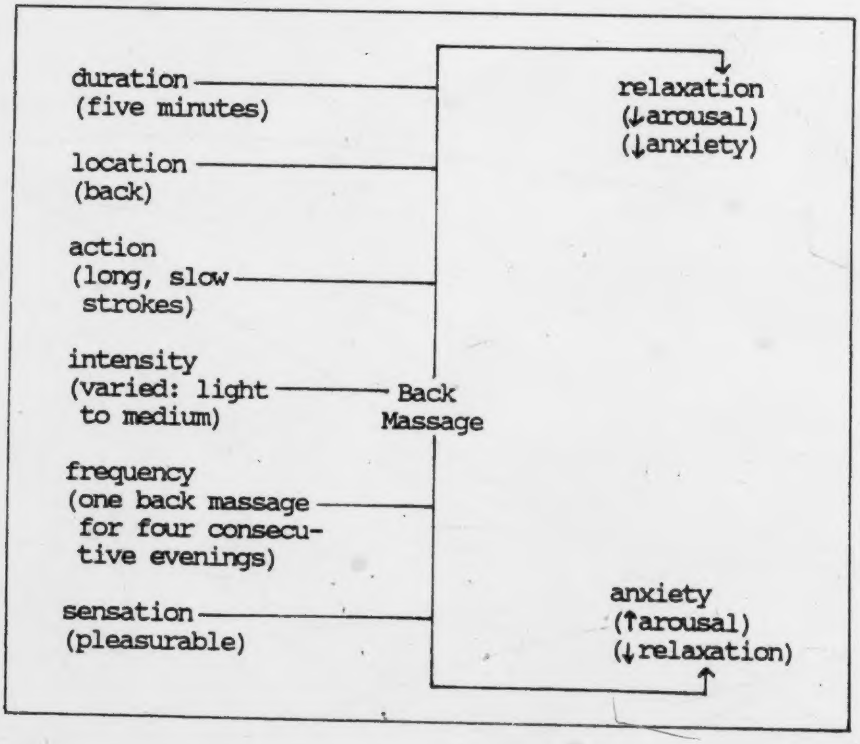
The aforementioned symbols of touch are congruent with the principles of massage put forth by Wood (1974). The components of massage which Wood states regulate outcome are duration, area to be touched (location), rate of movements (action), type of movement (sensation), pressure (intensity), and direction. According to Wood (1974) variations in these factors determine whether relaxation or arousal are achieved during massage.

According to Weiss' description of the quality of touch, moderate intensity appears to be the least therapeutic, whereas heavy or light intensity produce the most beneficial results. Wood stated that the effect obtained from massage depended upon the regulation of pressure as well. For example, deep pressure may produce stimulation where as light pressure may promote relaxation. Both authors suggest that variation in intensity is most advantageous. Wood further suggests that even rhythm is essential to ensure relaxation, as choice of massage movements also determines the effect achieved. Brisk techniques are stimulating and invigorating and slow stroke, effleurage massage can be comforting and relaxing (Wood, 1974). Therefore slow stroke effleurage movements were used in this research.

There are conflicting reports in the literature concerning the most beneficial length of time a massage should be given. Wood (1974) suggests that there is a short reflex effect of massage in inhibiting muscle tension. This phenomena may have accounted for the increase in mean HR and EMG reported by Longworth (1982) after a 6 minute massage. On the other hand the 3 minute massage resulted in an increase in autonomic arousal with contradicts the relaxation response obtained by the 3 minute massage in Fakouri and Jones (1987) study. Hence a five minute duration was arbitrarily chosen as the length of back massage in this study. Rhythm, rate of movement and intensity were based on recommendations by Downing, 1972; Hardy, 1975; Sims, 1986; Temple, 1967; Weiss, (1982); Wood, (1974); Longworth (1982). Figure 2.2 depicts the conceptual framework used in this study showing the duration, location, action, intensity and frequency of back-massage used. The framework provides guidelines for the back massage procedure used in this study and depicts that the intervention may have an effect on relaxation or anxiety levels. Within this framework is an assumption that anxiety levels can be measured by physiological and psychological measurement tools. The following chapter further describes the methods and procedures used in this study.

Figure 2.2:

Conceptual Framework



Chapter III

Methods and Procedures

Design

The research problem in this study was investigated by utilizing an experimental design with pre-test, post-test control group conditions. This approach was deemed appropriate to answer the question being asked and to gather the evidence required to test the hypotheses advanced in the study. Consideration was given to both the strengths and weaknesses of using an experimental design. One of the greatest strengths of an experimental design is the ability to provide a powerful vehicle for controlled testing of cause-and-effect relationships between variables due to strong internal validity (Kidder, 1980). The major weaknesses inherent in an experimental design that are relevant considerations in this study are the potential for the "Hawthorne effect", the potential for testing and instrumentation effects, and the potential for artificiality in the study (Babbie, 1986, p. 199). The "Hawthorne effect", which could result from subjects responses to knowledge of involvement in an experiment, could have acted to obscure the effects of the treatment, making the results questionable. The effects of testing and re-testing could have resulted in subjects becoming more sensitive to the tests and consequently answering in ways that would make them 'look good'. Changes in calibration or use of the measuring instruments could have produced unreliable measurements. However the instruments used in the study have been shown to produce reliable measurements with repeated use, and were used consistently by the researcher. In any case, if instrument, testing or "Hawthorne effects" were present in the study, all three groups being studied would have been subjected to similar effects. Artificiality, which makes experiments subject to questions concerning external validity or relevance to the real world, was of limited concern as this study was a field experiment. The study was not conducted in a laboratory but in an extended care facility, and the general conditions surrounding the experiments were natural. Other major problems concerning internal and external validity were controlled for by the design.

The three properties which characterize experimental designs were incorporated in the study: the use of independent and dependent variables, control groups, and randomization. The independent or treatment variable was back massage used only in the treatment group. The treatment group was engaged in normal conversation throughout the back massage treatment. Two control groups were employed with which to compare the effects of the back massage treatment - a group which was exposed to conversation with no back massage, and a group which received no intervention.

After the sample was gathered, treatment and control groups were established by randomly assigning twenty-one subjects to three groups, resulting in seven subjects in each group. As the sample was too large to perform the procedures on all subjects at the same time, it was broken down into four smaller groups which were randomly assigned to treatment periods. Both randomization procedures were carried out by pulling names from a hat and systematically assigning them to groups. Each subject participated in the treatment for four consecutive days, with the researcher conducting all experiments and taking all measurements. All treatments were done between 19:00 and 23:00 hours to promote consistency and to coincide with patients usual bedtimes.

The dependent variable was the level of anxiety, as measured by the self-evaluation questionnaire (STAI) and by physiological measurements of electromyograph recordings, systolic and diastolic blood pressure, and heart rate. Pre-test, post-test, and delayed response measurements were done on all subjects. Measurements were obtained immediately before and after, and ten minutes following treatments. A detailed description of the procedure is included in the procedures section. The experimental design used in the study is illustrated in Table 3.1.

Setting

The research was conducted in a 322 bed extended care center in a large western Canadian city. The residents of the center were adults requiring varying degrees of nursing care for long periods of time. The center provided several other services such as occupational therapy, physiotherapy, and recreational therapy. Residents also had access to an accounting department and a small

Table 3.1

Study Design

R	O_1	X_1	O_2	O_3
R	O_1	X_2	O_2	O_3
R	O_1	X_3	O_2	O_3

R	refers to random assignment of subjects to one of three treatment conditions
O_1	refers to pre-testing of subjects on dependent variables
X_1	refers to the treatment conditions of back massage with conversation
X_2	refers to the treatment condition of conversation only
X_3	refers to the treatment condition of no intervention
O_2	refers to post-testing of subjects on dependent variables
O_3	refers to delayed testing of subjects on dependent variables

store. The center was relatively new, with modern decor and a cheery atmosphere. The research was conducted in the patients' rooms where all had private or semi-private accomodation and a comfortable, "homey" feeling.

Population, Sample, Sampling

The population of interest in this study - the ideal target population - was composed of all patients who lived in an extended care facility who met the criteria for inclusion in the study. However, although it would be desirable to be able to randomly select subjects from and to generalize the results to that population, in this study generalizations are restricted to the population from which the accessible population was actually drawn. It was not feasible to randomly sample from the ideal target population; nevertheless, there was an underlying assumption here that the sample used was representative of a target population in the extended care facility from which the accessible population who met the criteria for selection was drawn.

The accessible population consisted of any patient residing in the extended care center who met the following criteria:

1. was 60 years of age or over;
2. could speak and understand English;
3. could lie in the side-lying position without undue discomfort;
4. achieved a score of six or over on the Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1967);

5. agreed to participate in the study and gave informed written consent.

Prior to sampling, the Director of Nursing and unit supervisors were asked to compile lists of potential subjects who were thought to meet the established criteria and who were deemed appropriate for the study. The sample for the study was then randomly drawn from the list of 82 patients who were subsequently suggested. The list contained the names of 82 patients who were designated as the accessible population for this study. It is noteworthy that of the first 24 patients randomly selected from the list, all agreed to participate when initially interviewed. Eagerness and willingness of the subjects to participate in the study could have been due to the fact that some of the subjects had met the researcher prior to this study, as they had been involved in prior research in which the researcher was involved as an assistant. However, this would not have been the case for the entire sample, as many had not met the researcher previously. A more likely reason may have been the desire for touch and comfort, particularly in the context of a procedure with which all the subjects were familiar and towards which all expressed positive attitudes.

Although all patients expressed a desire to be in the group receiving back massage, all were enthusiastic about the study regardless of group. The following is an example of the typical responses from patients when approached to be in the study. "I think it is wonderful that you are doing research for us (patients), no matter what group I am in. But I hope I get a back rub anyway, they feel so good." Back massage was not considered a usual part of patient care in this long term care facility, and no patients in the study received back massage from nursing staff in the course of regular nursing care while the study was taking place.

Prior to actual participation in the study three individuals were required to withdraw for health reasons. The three subjects were not replaced; thus 21 subjects participated in the study. There were 4 males and 17 females participating, ranging in age from 65 to 102 years. The mean age of the sample was 81.5 years. (Data was not collected on marital status, level of education, or actual diagnosis for this study; therefore, no inferential statistical tests could be done to provide evidence of statistical difference between the treatment groups on these variables). A summary table of the mean, range, and standard deviation of ages, and the frequency of gender for the entire sample and for the three groups is presented in Table 3.2.

Instruments

Four instruments were used to collect data or to obtain measurements in this study; the Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1967), the Self-Evaluation Questionnaire (STAI) Spielberger, Gorsuch, & Lushene, 1970), the Dinamap^{TM} Portable Adult/Pediatric and Neonatal Vital Signs Monitor (Critikon, 1987), and a Myomed 432 electromyogram machine (Enraj Nomius Delft). The SPMSQ was used as a screening device during the

Table 3.2

Summary of Personal Variables

Age

	mean	range	standard deviation	number
All Sample	81.43	65-102	5.80	21
Back Massage	75	65-88	8.12	7
Conversation	83	72-94	8.25	7
No Intervention	86.28	71-102	10.64	7

Sex (frequency)

	males	females
All Sample	4	17
Back Massage	2	5
Conversation	1	6
No Intervention	1	6

sampling procedure to ensure that subjects were cognitively competent or had only a mild level of impairment and hence could be shown to be mentally capable of participating in the study. The STAI was used to obtain psychological measurements of anxiety levels before and after treatment conditions. The vital signs monitor was used to measure anxiety levels by obtaining changes in systolic blood pressure, diastolic blood pressure, and heart rate before, directly after, and ten minutes following treatment conditions. The electromyograph machine was used to measure anxiety levels by obtaining changes in muscle activity before, after, and ten minutes following the treatment conditions.

The Short Portable Mental Status Questionnaire

The SPMSQ is a short, portable questionnaire which provides an objective and quantitative measure of mental status. It was developed to assess the presence and intensity of intellectual disorders of organic origin in elderly persons (Pfeiffer, 1975). The questionnaire consists of 10 items which explore short-term memory, long-term memory, orientation to surroundings, and the capacity to perform serial mathematical tasks. All 10 items were asked of each subject, the entire test being easily administered within 3 minutes. Each correct answer is awarded a score of 1 point, and the lower the score, the greater the cognitive impairment. Eight to 10 errors indicates severe intellectual impairment, 5-7 errors indicates moderate intellectual impairment, 3-4 errors indicates mild intellectual impairment, and 0-2 errors indicates intact intellectual capability. The SPMSQ is included in Appendix A.

The validity of the SPMSQ as a measure of organic mental impairment was tested in elderly populations both in the community and in institutions (Whanger, A.D., 1973; Pfieffer, 1975). The tool was reported to have face validity with 92% agreement between the SPMSQ score and the clinical diagnosis when the SPMSQ result indicated definite impairment and 82% agreement when the SPMSQ result indicated either no impairment or only mild impairment. Reliability studies were done with two groups of subjects aged 65 years and over (Pfeiffer, 1975) resulting in test-retest correlations of 0.82 and 0.83 indicating stability of responses. The SPMSQ has been used and found appropriate in nursing research studies with geriatric patients (Langland and Panicucci, 1982).

The Self-Evaluation Questionnaire, X-1 (Spielberger, Gorsuch, and Luschene, 1970)

The Self-Evaluation Questionnaire, X-I (STAI) was used to measure the dependent variable anxiety. The STAI is a 40 item self-evaluation inventory designed to measure and distinguish between transitory anxiety states (A-state) and relatively stable personality dispositions toward anxiety (A-trait). The A-state questionnaire used in the study to measure transitory anxiety is composed of 20 questions which ask the individual to describe feelings at that particular moment in time. Examples of items included in the questionnaire are "I feel nervous", "I feel content", "I am relaxed", "I am jittery". To reduce the potential influence of an acquiescence response set, 10 items in the A-state scale are scored directly and 10 are reversed. Subjects rate themselves on a four-point scale of increasing intensity from not at all, somewhat, moderately so, to very much so. The questionnaire took less than five minutes to administer to each subject. Each respondent was asked to choose the response which reflected how he or she felt at that very moment. Each item is given a weighted score of 1 to 4. A rating of 4 indicates the presence of a high level of anxiety for 10 state-anxiety items, (eg. "I feel upset", "I feel anxious") and a high rating indicates the absence of anxiety for the remaining 10 items (eg. "I feel calm", "I am relaxed"). The scoring weights for the anxiety - present items are the same as the numbers marked on the form while the scoring weights for the anxiety - absent items are reversed. The anxiety - present items are 3, 4, 6, 7, 9, 12, 13, 14, 17, 18 and the anxiety - absent items are 1, 2, 5, 8, 10, 11, 15, 16, 19, 20. Total scores are obtained by adding the weighted scores for the twenty items, taking into account the fact that the scores are reversed for half of the items. Scores can vary from 20 to 80, with the higher the score the higher the level of anxiety. The STAI X-1 is illustrated in Appendix B.

The STAI was originally developed as a research instrument for investigating state-anxiety in normal adults. Normative data are reported for male neuropsychiatric patients, general medical-surgical patients and young prisoners. (Speilberger, et al., 1970). The STAI has been used extensively in anxiety research which includes studies in elderly populations (Alexander, French and Longworth, 1982; Goodman, 1975; Bird, 1979; Leboeuf, 1977; Martuza & Kallstrom, 1974; Heidt, 1981; Quinn, 1983).

The stability coefficients for the state-anxiety scale were validated on studies done on three groups of undergraduate college students under four experimental conditions. The test-retest correlations resulted in a median reliability coefficient of .33. The researchers claim that this relatively low stability would be expected for the state-anxiety scale "because a valid measure of state anxiety should reflect the influence of unique situational factors that exist at the time of testing" (Speilberger, et al, 1970, p.13). With this in mind, it was noted that measures of internal consistency such as the alpha coefficient may provide a more meaningful index of the reliability of state-anxiety scales than test-retest correlations given the transitory nature of anxiety states. Using Cronbach's alpha all but one of the state anxiety alphas were found to be approximately .90 when tested in samples of working adults, students, and military recruits, with a median coefficient of .93.

Construct validity of the A-state scale was established using a sample of 977 undergraduate college students. The questionnaire was given under normal conditions (low-stress) and under exam conditions (high-stress). The mean S-anxiety scores were substantially higher in the exam conditions (57.75) than in the normal conditions (36.69). Item analysis revealed that scores for each individual item were higher in the exam conditions and hence discriminated significantly between the two conditions.

The STAI has been shown to be an excellent instrument for assessing anxiety in elderly persons (Patterson, O'Sullivan, & Spielberger, 1980; McDonald & Spielberger, 1983), and in over three hundred investigations in the areas of relaxation training and biofeedback (Spielberger, 1983).

Physiological Measurements

The Dinamap™ Portable Adult/Pediatric and Neonatal Vital Signs Monitor

The Dinamap™ vital signs monitor, model 8100, by Critikon (A. Johnson & Johnson Company) was used to record blood pressure and pulse measurements on all patients. This monitor provides digital displays of measurements and is widely used in acute care units. Blood pressure accuracy is reported to meet and exceed proposed AAMI standards for non-invasive blood pressure accuracy (AAMI Standard: 15 mm Hg. mean error; 8 mm HG standard deviation). Pulse rate accuracy is reported at 13.5 percent (Critikon, 1987).

Electromyogram

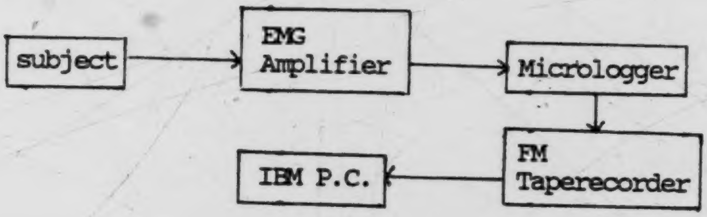
In this study surface electromyography was done using a MYOMED 432 electromyogram machine by Enraf NONIUS Delft. Electromyograms allow recording of electrical changes in muscles by means of an electrode in contact with the skin over the muscle, or by needle electrodes inserted into the muscle through the skin (Lichte, 1956). Surface electrodes are of value when one wishes to record the amount of electrical activity associated with muscular contraction and when it is not necessary to study the character of individual motor unit potentials (Lenmar & Ritchie, 1983). Surface electromyography has been advocated as the best indicator of general muscle tension when coupled with an EMG integrator, a device that sums up the voltage generated in a storage capacitor for a fixed time interval.

Surface electrode recording has been suggested as the method of choice where a global pick up of superficial muscle activity is desirable as in psychophysiological studies of general gross relaxation of tension (Basmajian & Deluca, 1985). These authors further suggested that the integrated rectified EMG signal from forehead surface electrodes generally reflects the global EMG of muscular activities down to about the first rib, and can be at the very least used as a rough indicator of relaxation.

In this study, silver/silver chloride bipolar surface electrodes 10 mm in diameter were used to pick up EMG signals. The electrodes were placed on the frontalis muscle half way between the eyebrow and hairline. Prior to attaching the electrodes, the forehead was cleansed and 3M^{TM} sandpaper tape was used as a light abrasive to remove the dead surface layer of skin. The gaps under the silver discs were filled with signa creme^{TM}, and the electrodes were fixed to the skin with the double strips of 3M^{TM} micropore nonallergenic tape to maintain pressure at the electrode sites.

The EMG amplifier was set at 100 uV at a 0-3 second integration time which means that the EMG signal was rectified and averaged over a period of 3 seconds. The EMG amplifier was attached to a Campbell Scientific 21X Micrologger, and data was sampled every second with date, time and sample stored into 560 byte memory and then transmitted to a Panasonic (Model No. RQ-8300) FM magnetic tape recorder in analogue form. From the tape the data was downloaded to an IBM PC through an analog to digital converter. Figure 3.4 shows a schematic representation of the electromyogram apparatus.

Figure 3.3 Block diagram of EMG apparatus



To maintain consistency all treatments were carried out by the researcher. In the conversation group, topics were chosen by the subjects and varied from day to day in relation to subjects discussed. The back massage was a slow, rhythmic massage using a combination of light to moderate pressure from the crown of the head to the sacral area, down to the posterior rami. There was continuous contact during the massage using circular motions and no crossing over of hands. Topics of conversations during the massage were chosen by the subjects.

Procedure

After being granted ethical approval from the Faculty of Nursing in February, 1988 and from the extended care center in March, 1988, formal entry into the extended care center was gained in April, 1988. Sampling began on April 14 and was completed by May 7, 1988. The actual selection of the sample and explanations of the study took only four days to complete as subjects appeared excited about the research when they were approached and readily agreed to participate in the study.

The purpose and nature of the study was thoroughly explained to each potential subject by the researcher. Confidentiality was assured and potential participants were invited to ask questions. All questions were answered by the researcher as honestly and completely as possible. After each participant signed the consent form, the SPMSQ was administered by the researcher. All subjects scored over 8 on the questionnaire and hence were viewed as participants in the study. At this time data was obtained on age and usual bedtimes for each participant. Each person was informed of tentative dates when the research would begin and was told that when possible, studies would be conducted at bedtime. Participants were also told the approximate date that they would be notified of schedules and which group they would be in.

Once consents were signed and prior to actual random assignment to groups, three patients were forced to withdraw due to illness, leaving a final sample of 21 subjects. Subjects were randomly assigned to the three treatment conditions by substituting each name with a number between 1 and 21, putting the numbers in a hat, and consecutively assigning each number pulled to one of the three groups. The researcher then compiled a schedule in which subjects were assigned four day treatment periods. No more than six patients were placed into each time period to allow the researcher to complete all treatments between 18:00 - 23:00 hours. Table 3.3 illustrates participants' treatment schedules. Patients who indicated that they usually retired at approximately 18:30 - 19:00 hours were scheduled at these times and those who retired later were scheduled later. Once subjects were scheduled into treatment days and times, they were each notified in person by the researcher, and the schedules confirmed contingent upon the researcher obtaining the required equipment at that time. Prior to this, the researcher had inquired about obtaining an automatic vital signs monitor and an electromyography machine from several private firms. The equipment was obtained in May and pretested on four subjects known to the researcher. The pretests indicated that the equipment produced reliable results and could be assembled with ease. Practice sessions were done 6 times to ensure consistency in approach and to enhance familiarity with the equipment.

The initial treatment period was from May 24, 1988 to May 27, 1988. Six subjects participated; 2 from each of the three groups. The researcher began the first treatment condition at 18:30 hours and completed the last treatment condition at 23:00 hours. Actual

Table 3.3

Treatment Schedule for Participants

Time\Group	Back Massage	Conversation Only	No Intervention	Totals
Time Frame I (Tues to Fri)	2	2	2	6
Time Frame II (Mon to Thurs)	2	2	2	6
Time Frame III (Fri to Mon)	1	2	2	5
Time Frame IV (Tues to Fri)	2	1	1	4
Total	7	7	7	21

time spent with each subject was approximately 40 minutes with the remaining time spent going between rooms. This time gradually decreased as the researcher became more familiar with each room and became more facile with the equipment. As subjects became familiar with the procedures, they were more likely to be in bed or ready for bed at the scheduled times; therefore by the last evening the complete procedure started at 19:30 and ended at 22:40, with much less time being spent moving between subjects.

The next treatment periods were from May 30, 1988 to June 2, 1988, from June 3, 1988 to June 6, 1988, and from June 7, 1988 to June 10, 1988. The respective groups consisted of 2 back massage subjects; 2 conversation only and 2 no-intervention subjects; 1 back massage subject, 2 conversation only, and 2 no intervention; 2 back massage, 1 conversation only, and 2 no intervention subjects. All subjects participated throughout the duration of the study and all expressed great interest in the proceedings.

Preparation of Equipment and Sequence of Measurement

For four consecutive evenings at, or just prior to the subject's usual bedtime, the subject was assisted into bed if he/she was not already in bed. All subjects were given a description of the procedure which was to follow. They were then asked to lie on their right side with their head on a pillow, and to maintain that position for the duration of the experiment. The procedure was conducted in the following manner:

1) The ground from the EMG machine was dampened with tap water and attached to the subject's left hand with a velcro strap.
2) The frontalis area was prepared, electrode gel was applied, and the EMG electrodes were attached to the frontalis with three strips of 3M and micropore nonallergenic tape.
3) The left brachial artery was found and the blood pressure cuff was applied to the left arm with the transducer over the brachial artery.
4) The STAI questionnaire was given and answers were recorded by the researcher.
5) The EMG machine and the vital signs monitor was turned on and initial measurements were taken (60 seconds of electromyogram recordings and one blood pressure and pulse measurement).

6) Five minutes of back massage and/or conversation was completed for those in the treatment groups, and no intervention for those in the control group.

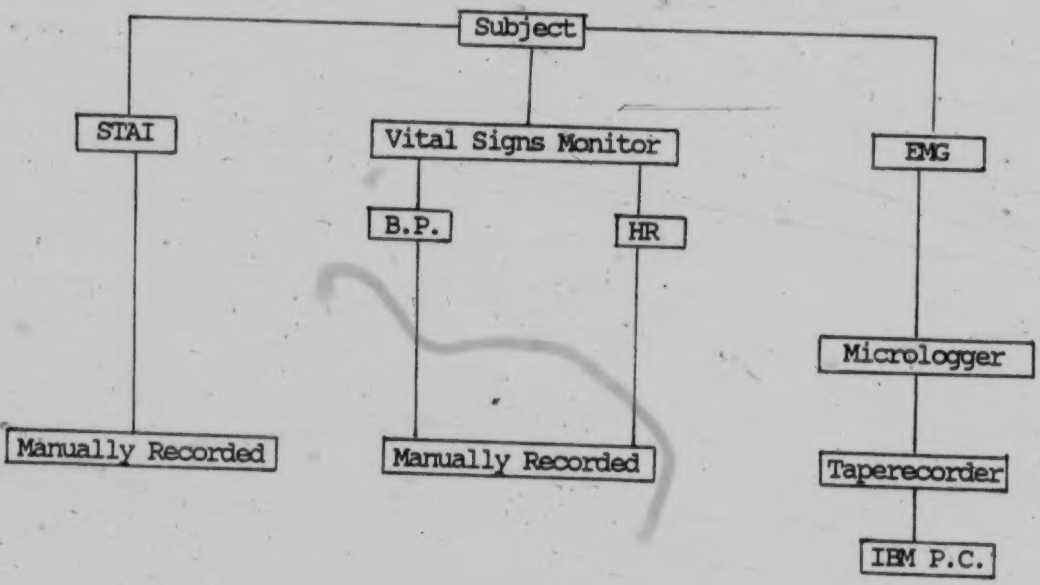
7) Ten (10) minutes of recordings were done following each treatment with a total of a minimum of 16 minutes on all participants. Vital signs were recorded every three minutes throughout the procedure.

8) The STAI questionnaire was again given with the researcher recording responses.

9) The equipment was disconnected and the patients were repositioned if they so desired.

10) All comments and noticeable movements were recorded. Figure 3.4 shows a schematic representation of the apparatus used.

Figure 3.4 Diagram of measurement apparatus



Treatments

Back Massage Treatment

All treatments took place in the privacy of the subject's own bed with the curtains drawn and the door shut. The researcher explained the process of being monitored with the electromyograph and vital signs monitor. After the instruments were connected and the subject was positioned on the right side, the STAI questionnaire was administered by the researcher, and one minute of blood-pressure, heart rate and EMG measurements were recorded. Back massage treatment was given and subjects were asked to remain in the same position until ten minutes following the treatment at which time the physiological measurements were recorded and the STAI was again administered. Throughout the massage subjects were allowed to discuss anything they wished to speak about. Conversations tended to center around the massage itself; for example, one individual said "Oh, that feels good, if I had a tail I would wag it". Some comments that were made by others were "that feels nice, I like it. It's too bad we can't have this all the time, but I know the nurses are too busy", and "that feels grand. I could just purr-oh, that's lovely". As well as positive expressions toward the treatment, conversations often focused around families and in general pleasant subjects. One gentleman was in the midst of divorce proceedings and occasionally discussed his wife. This individual expressed much appreciation each time he received a back massage. The following are examples of his comments: "That back rub sure feels good. It helps me relax. I'm still worried about things but it is easier now to relax. I sure slept well last night after you left". The last night he stated "the last three nights I slept all night. That's the best three nights I have had in the last 18 months. I fell asleep right away and woke up at 7:20 am. I always have trouble sleeping. It's not only the back rubs, it's having you to talk to. It's probably some of both, but I think it is your bedside manner". Most of the subjects shut their eyes during the back massage and remained quiet with their eyes shut for the ten minutes following treatment.

Conversation Only Treatment

The treatments were again all conducted in privacy with each participant in bed with the curtains drawn around it and the door shut. The researcher described what to expect while being monitored by the electromyograph and vital signs machine. Once the instruments were connected and the subjects were positioned comfortably on the right side, the STAI questionnaire was administered by the researcher and one minute of blood pressure, heart rate and EMG measurements were done. For the next five minutes participants were informed that they could talk to the researcher. Initially some of the subjects were quiet for the first few moments, and if they did not begin a conversation, topics were introduced by the researcher. When this occurred it was only on the first day of the four day treatment period. Each time it was necessary for the researcher to initiate the conversation, the same question was used - "how long have you been here Mrs. ___ or Mr. ___?" That was generally sufficient to open the conversation and usually led to discussions about the institution or about family. Subjects in this group frequently focussed on problems such as family worries, money problems, health concerns, or conflicts with roommates. One lady frequently discussed a previous love relationship and became very animated, sharing jokes and laughing with the researcher. At one point she observed that this research was about relaxation and stated "I'm afraid I'm not very relaxed now, in fact I'm quite excited thinking about all those things we did together and the fun we had."

At times it was difficult to stop conversations at exactly five minutes, however after the first session with each group, and when participants became more aware of the need to adhere to the given protocol, it was much easier to end conversations at the appropriate time. All of the participants related easily to the researcher and at the last session with those in the conversation group, many expressed sadness that the study was over. Several individuals made comments such as "I will miss you, I hope you can come back and see me" and "I have enjoyed this, you are easy to talk to. I will miss you when you are gone."

One lady said "When I had these treatments last night (referring to the instruments) I rested so well. I will miss you when we are finished, you are so kind." During the ten minute post-conversation interval, all participants rested quietly on their right side. STAI questionnaires were administered by the researcher at the end of the ten minutes.

No Intervention Group

The no intervention group were treated the same way as the two other groups with the exception of the treatments. The subjects were all in the privacy of their own bed with curtains drawn and doors shut. The researcher described what to expect in regards to the equipment in exactly the same manner as for the other groups. Once the equipment was connected and the subjects were positioned comfortably on their right side, the STAI questionnaire was administered by the researcher. The instruments were turned on after participants were reminded that they could not talk to the researcher while the study was in progress. On the first night of the four day study, some of the participants appeared to have a difficult time refraining from conversation. Some had to be reminded that they could not speak while the machines were on but that they could talk to the researcher later. As they became accustomed to the procedure, refraining from conversation became less of a problem. The researcher often stayed longer following the last recording and after the STAI was administered as the participants often wanted to talk. Some individuals expressed a desire to have a back massage saying "I would like to have a back rub sometime if you have time". The researcher returned to these individuals on the last day of the study to give them a back massage. At these times the participants would say such things as "that feels glorious. It is lovely", "oh, that feels wonderful. I bet you will win an award for the best research", and "that feels so good, it was worth waiting for".

The researcher kept a diary throughout the study and recorded comments and noticeable movements or interruptions during the treatment periods for all participants in all three groups.

Ethical Considerations

Because the study involved human subjects, ethical considerations related to consent and confidentiality were addressed. Prior to obtaining written consent, the purpose of the study was explained by the researcher to each potential subject. Information was given about the procedures to be used, the risks and benefits involved and the freedom to withdraw from the study at any time without recrimination. The discussions took place in the privacy of each subject's room and assurance was given of confidentiality and anonymity of the data. Those who agreed to participate were requested to sign the consent form which is illustrated as Appendix C. A copy of the signed informed consent form was retained by each participant.

Ethical clearance for the study was obtained from the Faculty of Nursing "Ethics Review Committee" of the University of Alberta in February, 1988 and from the extended care center in March 1988. The "University Policy Related to Ethics in Human Research" (1985) and the Canadian Nurses Association "Ethical Guidelines for Nursing Research Involving Human Subjects" (1983) were adhered to throughout the study.

All data collected during the study has been kept at the researcher's home in a locked area. Subject names have been blacked out on data collection forms where names were used to ensure confidentiality and anonymity for participants. The consent forms will be retained for a period of no less than five years.

Data Analysis

The data collected in the study was analyzed using both descriptive and inferential statistics. Personal variables such as age and gender were summarized using means, standard deviations, ranges and frequencies. This descriptive analysis was done by hand calculator by the researcher and was used to describe the three groups separately and the entire sample as a whole. Data collected on the dependent variable, anxiety, was summarized with descriptive statistics. Repeated measures analysis of variance and Scheffé tests were used to further analyze the data.

Field notes were kept by the researcher throughout the study to record relevant conversations which occurred during the experiments, and any significant events which occurred related to the study or which affected the personal lives of the subjects. Any observations such as movements of the subject, intrusions by staff or other patients, and activities in the corridor or in the next bed which could affect the subject were recorded. In particular it was felt that documentation of any unexpected movements or conversations which occurred during EMG and vital signs monitoring would be helpful in explaining unusual readings or obvious artifacts which might be displayed. The notes were considered important as the added data could provide information necessary to adequately interpret the data and draw conclusions from the results.

Chapter IV

Results and Discussion

Introduction

To test the hypotheses, the data generated from the study was entered into an MTS (Michigan Terminal System) file, on an AMDAHL 580/5860 mainframe computer. ANOV26, a statistical program which allows for an analysis of variance with repeated measures on one factor, was used for analysis. This program also provides post hoc Scheffe comparisons between the main effects for each factor (Division of Educational Research Services, 1984). A one-way ANOVA was used to examine mean differences between groups from pre to post, post to delayed, and pre to delayed time periods.

In this study, a distribution of difference scores was obtained for each group and each measure. Means and standard deviations for the difference scores were calculated. The means of the three groups were collapsed across the four days and three time periods. Analysis of variance (ANOVA) was performed using a repeated measures design (with pre-test, post-test and delayed response as factors) to determine if there were significant differences among the group mean differences on the dependent variable, anxiety. When results of the ANOVA showed significant differences among group means, Scheffe comparisons were subsequently made between the main effects for each factor among all pairs of means within and between treatment groups.

The ANOVA was considered appropriate in this study as it allows one to investigate two independent variables and the interaction between them in one experiment (Pagano, 1986, p.335). ANOVA is commonly used in experiments involving two or more independent groups. The Scheffe test was used because it is the most conservative test to assist in locating where significant differences between means lie after a significant F ratio has been obtained (Wilson, 1985, p.458).

The one-way ANOVA was used to determine the effects of the treatments (back massage, conversation only, and no treatment) and time (pretest to post and post to delayed reaction periods) on the dependent variable anxiety as measured by EMG, SBP, DBP, HR, and STAI (pretest to delayed reaction period).

The results for the dependent variable anxiety measured by physiological indicators (EMG, SBP, DBP, HR) and psychological indicators (STAI) are presented and discussed separately. Descriptive statistical results describing pre-test, post-test and post-to delayed test mean difference scores, group mean scores and ranges, ANOVA results and relevant Scheffe test comparisons are presented for each measurement. The researcher's interpretation of the results follow the results and discussion of the results. The results of the statistical analysis of the data related to the hypotheses are presented below with interpretations of the results following.

Hypothesis 1a

Elderly patients receiving back massage will display significantly lower electromyogram recordings than either those who receive conversation only or those who receive no intervention.

Electromyogram (EMG) Group Mean Scores

Table 4.1 and Figure 1 below illustrate the means within groups for the variable anxiety (as measured by EMG recorded in microvolts) for the three treatment periods. The following trends were found in the pre-test to post-test time periods. Subjects who received back massage treatments demonstrated a mean decrease of 0.23 on anxiety (EMG). The mean anxiety score (EMG) for the back massage groups was 8.26 (row mean). Those in the conversation group showed a mean decrease of 0.71 on anxiety (EMG). The mean anxiety (EMG) score for the conversation group was 9.12 (row mean). Participants in the no intervention group demonstrated a mean decrease of 1.67 on anxiety (EMG) scores. The mean anxiety (EMG) score for the no intervention group was 5.12 (row mean).

The mean anxiety (EMG) score for the no intervention group was 5.12 (row mean). The following trends were found in the post test to delayed response time period. Those participants who received back massage demonstrated a mean decrease on anxiety (EMG) of 2.68. The mean anxiety score (EMG) for the back massage group was 6.82 (row mean). Those participants in the conversation group of anxiety (EMG) demonstrated a mean decrease of anxiety (EMG) of 2.73. The mean

Table 4.1

Anxiety Level (EMG): Group Mean Scores

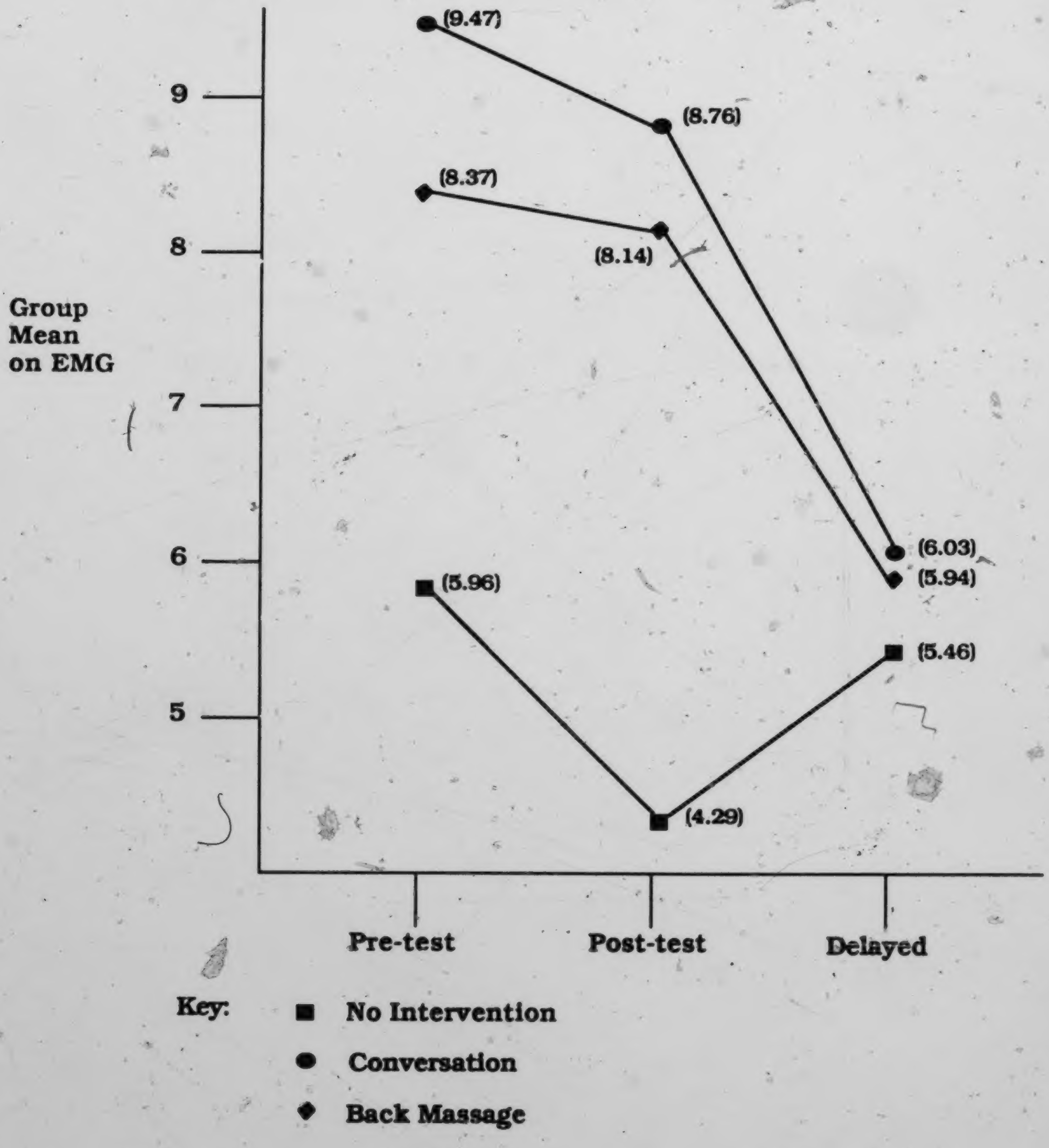
Group	Pre-Test	Post-Test	Group Mean/ Row Mean	
Back Massage	8.37	8.14	8.26	
Conversation	9.47	8.76	9.12	
No Intervention	5.96	4.29	5.12	
(Column Mean)	7.93	7.06	7.50	(Grand Mean)

Group	Post-Test	Delayed Test	Group Mean/ Row Mean	
Back Massage	8.14	5.46	6.82	
Conversation	8.76	6.03	7.40	
No Intervention	4.29	5.94	5.12	
(Column Mean)	7.06	5.81	6.44	(Grand Mean)

Group	Pre-Test	Delayed Test	Group Mean/ Row Mean	
Back Massage	8.37	5.46	6.92	
Conversation	9.47	6.03	7.75	
No Intervention	5.96	5.94	5.95	
(Column Mean)	7.93	5.81	6.87	(Grand Mean)

Figure 5

Group Mean Anxiety Levels (EMG)



mean anxiety (EMG) score for the conversation group was 7.40 (row mean). The no intervention group participants demonstrated a mean increase of 1.65 on anxiety (EMG) scores. The mean anxiety (EMG) score for the no intervention group was 5.12 (row mean).

The following trends were found in the pre-test to delayed time periods. Those who received back massage treatments demonstrated a mean decrease of 2.91 in anxiety (EMG). The mean anxiety score (EMG) for this group was 6.92 (row mean). Those in the conversation group demonstrated a mean decrease of 3.44 on anxiety (EMG). The mean anxiety (EMG) score for this group was 7.75 (row mean). Participants in the no intervention group showed a mean decrease of 0.02 on anxiety (EMG) scores. The mean anxiety (EMG) score for this group was 5.95 (row mean).

These trends in the within group means suggest that over the pre-test to post-test time periods all three groups showed a decrease in mean anxiety (EMG) scores. The greatest decrease occurred in the no intervention group, while the decrease in anxiety (EMG) in the other two groups was less pronounced. The trends in the within group means demonstrate that over the post-test to delayed response time periods the back massage and conversation group showed decreases in mean anxiety (EMG) scores, whereas the no intervention groups showed an increase in anxiety (EMG) scores. Trends in the pre-test to delayed response times indicate decreases in anxiety (EMG) scores in all three groups. The decrease in anxiety scores for the back massage and conversation group participants were very similar, while the no intervention group participants showed an almost negligible decrease.

Figure 5, and Table 4.1 demonstrate that while the pre-test scores for the back massage and conversation groups were relatively similar (8.37 and 9.47 respectively) the score for the no intervention group was remarkably different (5.96). These characteristics remained relatively stable throughout the three time period comparisons (Table 4.1). The no intervention group showed a decrease in anxiety (EMG) scores in the pre to post comparison and an increase in anxiety (EMG) in the post to delayed response time comparison, yet the group (row mean) scores in both comparisons were identical (5.12). This group also showed a slight decrease in anxiety (EMG) scores from the pre to delayed response time period, yet again, the row mean score remained relatively similar to the previous two comparisons (5.95).

The mean score for all subjects on anxiety (EMG) at the pre-test time was 7.93 and at the post-test time was 7.06 (column means). This decrease of 0.87 from pre-test to post-test time suggested a slight overall decrease in anxiety (EMG) for the entire sample taken together. The grand mean, or the mean of all subject scores from all groups at both pre-test and post-test times was 7.50. The mean decrease of 1.25 on anxiety (EMG) from post-test time (7.06) to delayed test time (5.81) suggested an even larger overall decrease in anxiety for the entire sample taken together at the delayed test time period. The grand mean, of both the post test and response times was 6.44. There was a difference of 2.12 in mean anxiety (EMG) for all subjects from pre-test (7.93) to delayed test time (5.81) suggesting an overall decrease. The grand mean in anxiety (EMG) for the entire sample from pre-test to delayed test time for all subjects taken altogether at pre-test and delayed response time was 6.87.

The following observations can be made from the trends identified in Figure 5 and Table 4.1:

1) There may have been differences in EMG measurements between the no intervention participants and those in the other two groups, prior to any treatment, despite random selection and sampling. Small sample size may have contributed to decrease the effects of randomization.

2) The similarities in the row mean scores for the no intervention group during all three measurement periods suggest that this group remained relatively unaffected throughout the experiment in spite of fluctuations between the time intervals. These fluctuations appear to be due to extreme scores within the group and are nullified by the overall group row means.

3) There is a consistently similar decrease in the anxiety (EMG) scores for both the back massage and conversation group participants throughout the time period comparisons.

4) The grand mean comparisons show that the greatest overall decrease in anxiety (EMG) for all subjects in the study occurred in the post-test to delayed response interval.

ANOVA Results: EMG

The descriptive statistical results in Table 4.2 demonstrate a wide range in baseline EMG measurements for participants in all three groups. As large variability could diminish any statistical differences, mean differences were computed for each participant in the study. These mean differences as indicated in Tables 4.3 and 4.4 serve to decrease the effect of large variations in scores. ANOVA was computed on the difference scores for the dependent variable anxiety (EMG) as follows.

Table 4.2

Anxiety Levels (EMG): Descriptive Statistical Results

Anxiety Levels: EMG Pre-test

Group	Mean	Standard Deviation	Number	Range
All Sample	7.93	1.80	21	0.66-30.76
Back Massage	8.37	5.41	7	2.13-30.76
Conversation	9.47	3.41	7	0.66-23.97
No Intervention	5.96	2.54	7	1.79-17.23

Anxiety Levels: EMG Post-test

Group	Mean	Standard Deviation	Number	Range
All Sample	7.06	2.42	21	0.54-23.27
Back Massage	8.14	5.92	7	0.62-23.27
Conversation	8.76	3.75	7	1.56-21.20
No Intervention	4.29	2.56	7	0.54-11.46

Anxiety Levels: EMG Delayed Test

Group	Mean	Standard Deviation	Number	Range
All Sample	5.81	0.31	21	0.63-18.21
Back Massage	5.46	2.81	7	1.38-11.32
Conversation	6.03	3.47	7	1.24-18.21
No Intervention	5.94	3.85	7	0.63-17.75

Table 4.3

Anxiety Levels (EMG): Descriptive Statistical Results of Difference Scores

Anxiety: (EMG) Pre-test to Post-test

Group	Mean	Standard Deviation	Number	Range
All Sample	-0.68	2.61	21	-4.44- 6.74
Back Massage	-0.32	0.95	7	-1.54- 0.11
Conversation	-0.52	2.57	7	-4.44- 0.74
No Intervention	-1.85	0.73	7	-2.56--0.84

Anxiety Levels (EMG) Post-test to Delayed Test

Group	Mean	Standard Deviation	Number	Range
All Sample	-1.37	3.90	21	-3.80-3.62
Back Massage	-2.72	0.96	7	-3.80--1.48
Conversation	-2.82	2.62	7	-6.55--3.88
No Intervention	1.42	1.64	7	-0.11-3.62

Table 4.4

Anxiety Levels (EMG) Group Mean Difference Scores

Group	Pre-test-Post-test	Post-test-Delayed test	Group Mean/ Row Mean
Back Massage	-0.32	-2.72	-1.52
Conversation	-0.52	-2.82	-1.67
No Intervention	-1.85	1.42	-0.22
Column Mean	-0.90	-1.37	-1.14 (Grand Mean)

ANOVA results for the pre-test to post-test time period for anxiety (EMG) are summarized in Table 4.5. Results for the post-test to delayed-test time period are summarized in Table 4.6. ANOVA was used to test for significant differences in the mean differences between groups and differences from pre to post and post to delayed time periods. The level of significance for hypothesis testing was established at 0.05.

Firstly, there were no statistically significant differences found between the groups in the pre-test to post-test time period. This indicates that there was no statistically significant effect of back massage treatment on anxiety levels as measured by EMG, and the first hypothesis proposed in the study was not supported. Therefore elderly patients receiving back massage did not display significantly lower electromyogram recordings than those who did not receive back massage. Secondly, there was a statistically significant difference found between the three groups in the post-test to delayed response time period, as seen by the obtained probability of 0.04 in Table 4.6. This indicates that the treatments had a statistically significant effect on anxiety levels as measured by EMG over this time period.

Contrasts of Specific Means

The relevant Scheffé comparisons for the post-test to delayed response time for the dependent variable anxiety (EMG) are summarized in Table 4.7. The level of significance for hypothesis testing was established at 0.05. The Scheffé comparisons show that there was no statistically significant difference between any of the group mean

Table 4.5

Anxiety (EMG) Anova Results: Pre-test to Post-test

Source of Variation	Sum of Squares	D.F.	Mean Squares	F. Ratio	Probability
Between Groups	33.62	2	16.81	0.62	0.55
Within Groups	492.10	18	27.34		
Total	525.80	20			

Table 4.6

Anxiety (EMG) ANOVA Results: Post-test to Delayed-test

Source of Variation	Sum of Squares	D.F.	Mean Squares	F. Ratio	Probability
Between Groups	329.20	2	164.62	3.87	0.04
Within Groups	765.10	18	42.51		
Total	1094.00	20			

Table 4.7

Anxiety (EMG): Scheffé Comparisons: Post-test to Delayed-test

Comparison	Contrast	F-ratio	Probability
Conversation to No Intervention	-4.24	2.97	0.077
Conversation to Back Massage	-0.09	.001	0.999
No Intervention to Back Massage	-4.15	2.84	0.085

comparisons. The comparisons between conversation and back massage to the no intervention group approached statistical significance with probabilities of 0.077 and 0.085 respectively. These results suggest that the treatments (back massage and conversation) had a greater sustained effect on anxiety levels (EMG) when compared to the group that received no intervention. However, the effect of the back massage treatment was not significantly different from the conversation treatment; therefore the hypothesis proposed in the study that elderly patients receiving back massage would demonstrate a significantly greater sustained relaxation response than those who did not receive back massage was not supported by EMG results in this study.

Hypothesis 1b

Elderly patients receiving back massage will display greater decreases in systolic blood pressures than either those who receive conversation only or those who receive no intervention.

Systolic Blood Pressure (SBP) Group Mean Scores

Table 4.8 and Figure 6 below illustrate the means within groups for the variable anxiety as measured by systolic blood pressure (SBP) for the pre-test, post-test and delayed-test periods. The following trends can be seen in the pre-test and post-test time periods. Subjects who received back massage demonstrated a mean decrease of 6.48 on anxiety (SBP). The mean anxiety score (SBP) for the back massage group was 128.44 (row mean). Those in the conversation group showed a mean increase of 1.53 on anxiety (SBP) at the post-test

Table 4.8

Anxiety Levels (SBP): Group Mean Scores

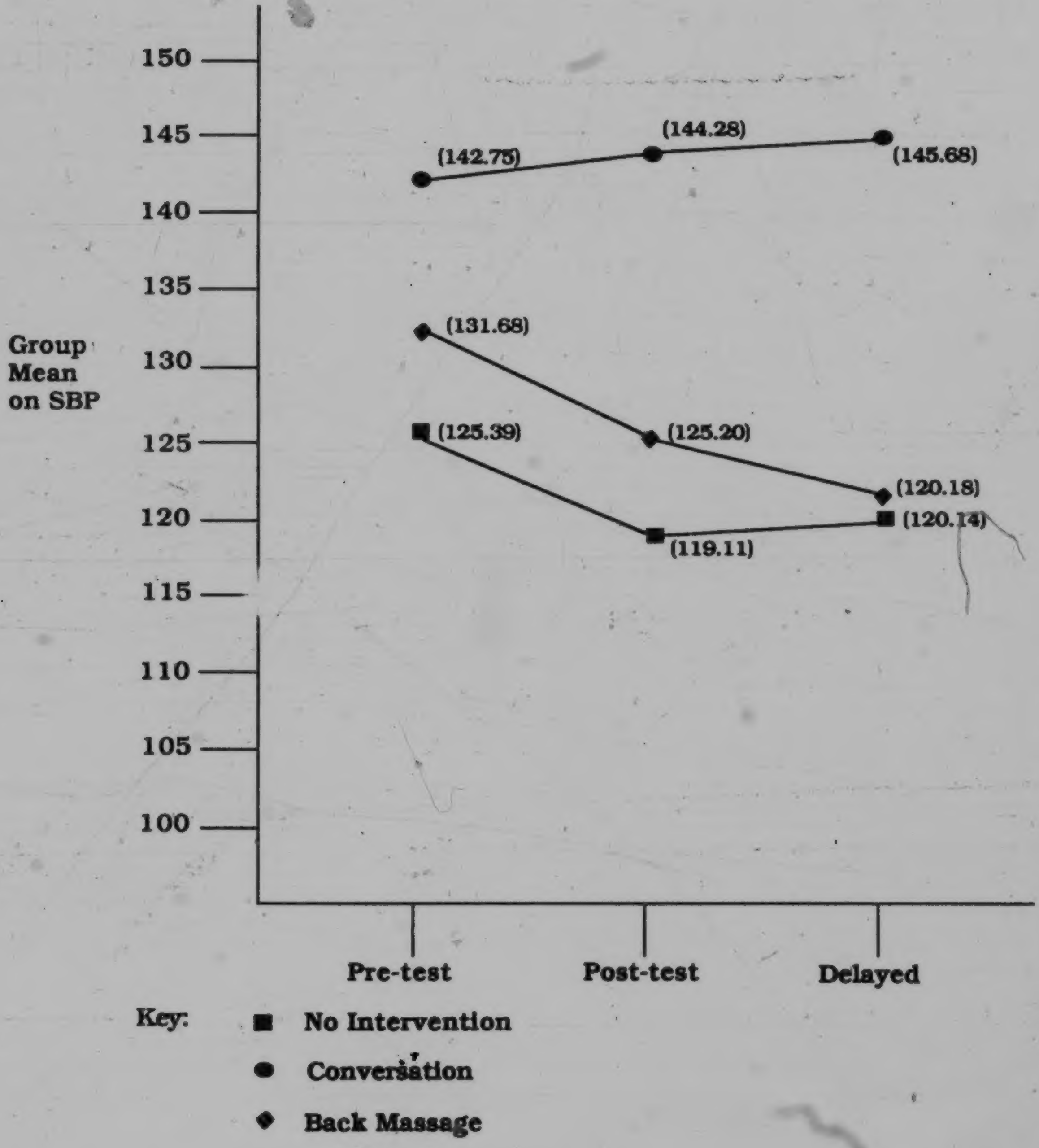
Group	Pre-Test	Post-Test	Group Mean/ Row Mean	
Back Massage	131.68	125.20	128.44	
Conversation	142.75	144.28	143.52	
No Intervention	125.39	119.11	122.25	
(Column Mean)	133.27	129.53	131.40	(Grand Mean)

Group	Post-Test	Delayed Test	Group Mean/ Row Mean	
Back Massage	125.20	120.18	122.69	
Conversation	144.28	145.68	144.98	
No Intervention	119.11	120.14	119.62	
(Column Mean)	129.53	128.67	129.10	(Grand Mean)

Group	Pre-Test	Delayed Test	Group Mean/ Row Mean	
Back Massage	131.68	120.18	125.93	
Conversation	142.75	145.68	144.22	
No Intervention	125.39	120.14	122.76	
(Column Mean)	133.27	128.67	130.97	(Grand Mean)

Figure 6

Group Mean Anxiety Levels (SBP)



time. The mean anxiety (SBP) score for the conversation group was 143.52 (row mean).

Participants in the no intervention group showed a mean decrease of 6.28 on anxiety (SBP) scores. The mean anxiety (SBP) score for the no intervention group was 122.25 (row mean).

The following trends were found in the post-test to delayed-test time period. Those participants who received back massage demonstrated a mean decrease of 5.02 on anxiety (SBP). The mean anxiety (SBP) score for the back massage group was 122.69 (row mean). Those in the conversation group demonstrated an increase in anxiety (SBP) of 1.40. The mean anxiety (SBP) score for this group was 144.98 (row mean). The no intervention group participants showed an increase of 1.03 on anxiety (SBP) scores. THe mean anxiety (SBP) scores for the no intervention group was 119.62.

The following trends were found in the pre-test to delayed time periods. Those who received back massage treatments demonstrated a mean decrease of 11.50 in anxiety (SBP). The mean anxiety score (SBP) for this group was 125.93. Conversation group participants demonstrated a mean increase of 2.93 on anxiety (SBP) scores. The mean anxiety (SBP) scores for this group was 144.22 (row mean). Participants in the no intervention group showed a decrease in anxiety (SBP) of 5.25. The mean anxiety (SBP) for this group was 122.76 (row mean).

These trends in the within group means suggest that over the three time periods, the back massage group showed a continuous significant decrease in mean anxiety (131.68 to 125.20 to 120.18). The conversation group showed a slight continuous increase in anxiety across the treatment periods (142.75 to 144.28 to 145.68). The no intervention group showed a mean decrease from the pre-test to post-test time period (125.39 to 119.11) and an almost negligible increase from the post-test to delayed time period (119.11 to 120.14).

Figure 6 and Table 4.8 demonstrate a discrepancy between all three groups prior to any treatment (pre-test scores). This discrepancy remained consistent throughout the measurement time periods as evidenced by group mean scores. The grand means, or the means of all subject scores from all groups for the three measurement periods remained relatively constant with the most obvious change occurring in the post-test to delayed time period.

ANOVA Results: SBP

The descriptive statistical results in Table 4.9 demonstrate a wide range in baseline SBP measurements for all subjects. As with the EMG measurements, ANOVA was computed on the difference scores for the dependent variable anxiety (SBP). Table 4.10 and 4.11 shows the mean difference scores for all three groups.

The ANOVA results for the pre-test to post-test time periods for anxiety (SBP) are summarized in Table 4.12.

The results for the post-test to delayed-test time period are summarized in Table 4.13. ANOVA was used to test for significant differences in the mean differences between groups and the interaction of groups by time. The level of significance for hypothesis testing was established at 0.05.

Table 4.9

Anxiety Level (SBP): Descriptive Statistical Results

Anxiety Levels: SBP Pre-test

Group	Mean	Standard Deviation	Number	Range
All Sample	133.27	46.20	12	92-203
Back Massage	131.68	9.89	7	99-154
Conversation	142.75	29.91	7	93-203
No Intervention	125.39	19.29	7	92-163

Anxiety Levels: SBP Post-test

Group	Mean	Standard Deviation	Number	Range
All Sample	129.53	20.71	21	91-205
Back Massage	125.20	15.65	7	99-162
Conversation	144.28	20.05	7	118-205
No Intervention	119.11	19.50	7	91-159

Anxiety Levels: SBP Delayed Test

Group	Mean	Standard Deviation	Number	Range
All Sample	128.67	21.80	21	90-178
Back Massage	120.18	11.47	7	97-154
Conversation	145.68	22.83	7	103-178
No Intervention	120.14	20.61	7	90-165

Table 4.10

Anxiety Levels (SBP): Descriptive Statistical Results of Difference Scores

Anxiety: (SBP) Pre-test to Post-test

Group	Mean	Standard Deviation	Number	Range
All Sample	-2.40	9.95	21	-19.00-27.00
Back Massage	-4.93	10.51	7	-19.00-11.75
Conversation	4.00	11.84	7	-8.25-27.00
No Intervention	-6.28	2.57	7	-8.00-9.50

Anxiety Levels (SBP) Post-test to Delayed Test

Group	Mean	Standard Deviation	Number	Range
All Sample	-2.36	8.39	21	-27.75-7.75
Back Massage	-5.46	11.91	7	-27.75-6.25
Conversation	2.64	6.41	7	-6.75-7.75
No Intervention	1.04	5.20	7	-12.00-3.75

Table 4.11

Anxiety Levels (SBP) Group Mean Difference Scores

Group	Pre-test-Post-test	Post-test-Delayed test	Group Mean/ Row Mean
Back Massage	-4.93	-5.46	-5.20
Conversation	4.00	2.64	3.32
No Intervention	-6.28	1.04	-2.62
Column Mean	-2.40	-2.36	-1.50 (Grand Mean)

Table 4.12

Anxiety (SBP) ANOVA Results: Pre-test to Post-test

Source of Variation	Sum of Squares	D.F.	Mean Squares	F. Ratio	Probability
Between Groups	1749	2	874.33	2.55	0.11
Within Groups	6173	18	342.95		
Total	7922	20			

Table 4.13

Anxiety Levels (SBP) ANOVA Results: Post-test to Delayed-test

Source of Variation	Sum of Squares	D.F.	Mean Squares	F. Ratio	Probability
Between Groups	615.9	2	307.94	1.14	0.34
Within Groups	4869.0	18	270.52		
Total	5485.0	20			

Although approaching significance (0.11) at pre to post test time, there was no statistically significant difference between the groups noted at the pre-test to post-test or the post-test to delayed test time periods. This indicates that there was no statistically significant effect of treatment on the groups' anxiety levels as measured by SBP. The results do not support the hypothesis proposed in this study that elderly patients receiving back massage would demonstrate significantly greater decreases in anxiety (SBP) than those who did not receive back massage. Nor was there support for the hypothesis that elderly patients receiving back massage would demonstrate a significantly greater sustained response than those who did not receive a back massage.

Hypothesis 1c

Elderly patients receiving back massage will display greater decreases in diastolic blood pressure than either those who receive conversation only or those who receive no intervention.

Diastolic Blood Pressure (DBP) Group Mean Scores

Table 4.14 and Figure 7 illustrate the means within groups for the variable anxiety as measured by diastolic blood pressure (DBP) for the pre-test, post-test and delayed-test periods. The following trends can be seen in the pre-test to post-test time periods. Subjects who received back massage demonstrated no change on anxiety

Table 4.14

Anxiety Levels (DBP): Group Mean Scores

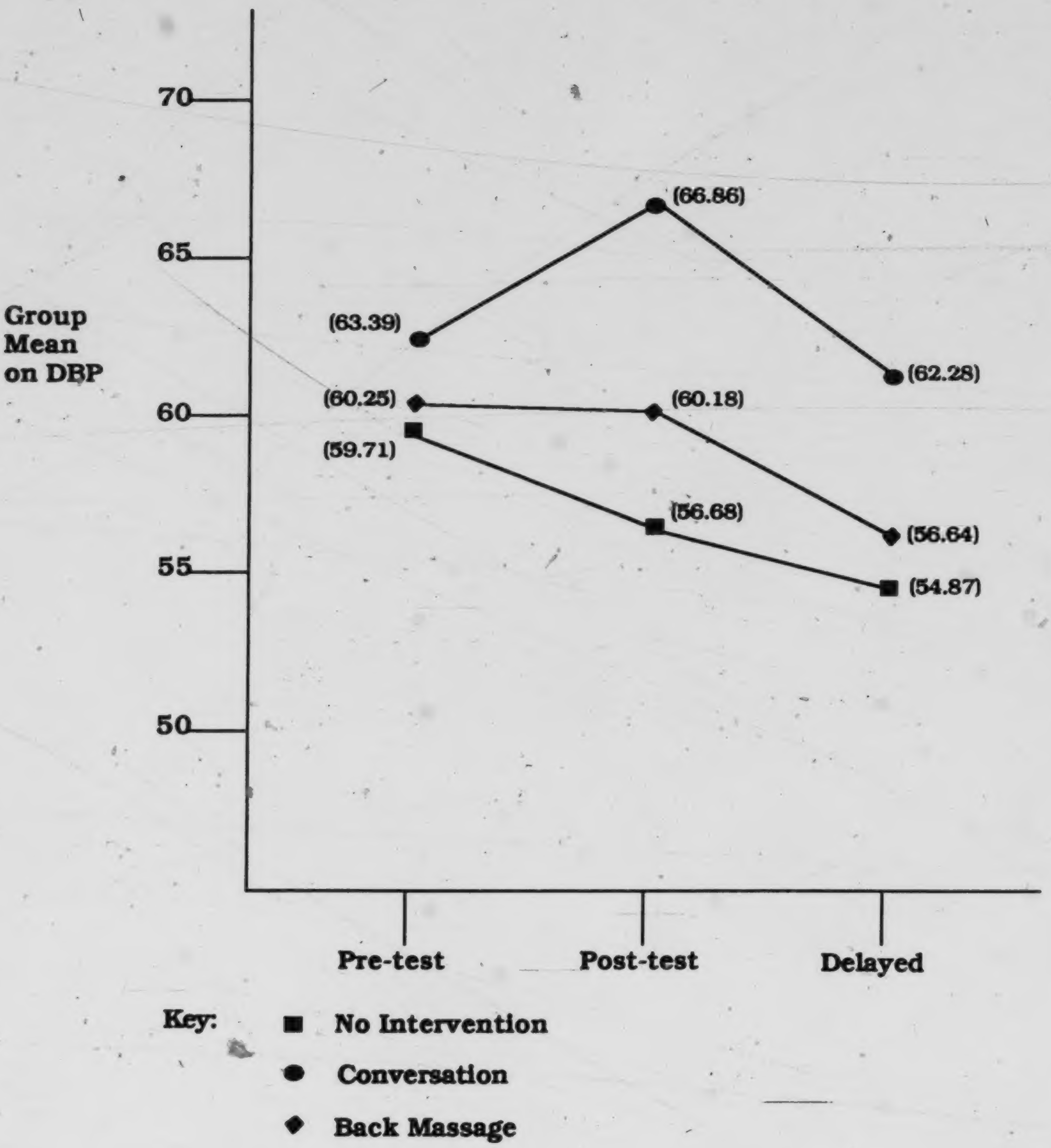
Group	Pre-Test	Post-Test	Group Mean/ Row Mean	
Back Massage	60.25	60.18	60.22	
Conversation	63.39	66.86	65.12	
No Intervention	59.71	56.68	58.20	
(Column Mean)	61.12	61.24	61.18	(Grand Mean)

Group	Post-Test	Delayed Test	Group Mean/ Row Mean	
Back Massage	60.18	56.64	58.41	
Conversation	66.86	62.28	64.57	
No Intervention	56.68	54.87	55.78	
(Column Mean)	61.24	57.93	59.59	(Grand Mean)

Group	Pre-Test	Delayed Test	Group Mean/ Row Mean	
Back Massage	60.25	56.64	58.44	
Conversation	63.39	62.28	62.83	
No Intervention	59.71	54.87	57.29	
(Column Mean)	61.12	57.93	59.92	(Grand Mean)

Figure 7

Group Mean Anxiety Levels (DBP)



(DBP). The mean anxiety score (DBP) for the back massage groups was 60.22 (row mean). Conversation group participants showed a mean increase of 3.47 on anxiety (DBP) at the post-test time.

The mean anxiety (DBP) score for the conversation group was 65.12 (row mean). Those who received no intervention showed a mean decrease of 3.03 on anxiety (DBP) scores. The mean anxiety (DBP) score for this group was 58.20 (row mean).

The following trends were seen in the post-test to delayed test time periods. Those who received back massage showed a mean decrease of 3.54 on anxiety (DBP). The mean anxiety (DBP) scores for this group was 58.41 (row mean). Those in the conversation group demonstrated a mean decrease of 4.58 on anxiety (DBP). The mean anxiety (DBP) score for this group was 64.57 (row mean). The no intervention group participants showed a decrease of 1.81 on anxiety (DBP) scores. The mean anxiety (DBP) score for this group was 55.78 (row mean).

In the pre-test to delayed-test time period the following trends were found. Those who received back massage demonstrated a mean decrease of 3.61 an anxiety (DBP) with a mean anxiety score (DBP) for the group being 58.44 (row mean). Those who were in the conversation group showed a mean decrease of 1.11 on anxiety (DBP). The mean anxiety (DBP) scores for these participants was 62.83 (row mean). The no intervention group showed a mean decrease of 4.84 with a mean anxiety (DBP) score of 57.29 for the group (row mean).

These trends in the within group means suggest that in the pre-test to post-test time periods only the group who received no intervention demonstrated a decrease in anxiety (DBP), while those who received back massage showed essentially no change and those in the conversation group demonstrated an increase in anxiety (DBP). In the post-test to delayed time period all three groups demonstrated a decrease in anxiety (DBP) with the conversation group having the greatest decrease. Trends in the pre-test to delayed response time measurements suggest a decrease in anxiety (DBP) for all three groups. Subjects in the back massage and no intervention groups demonstrated similar decrease in anxiety and larger decreases than those in the conversation group. Figure 7 and Table 4.14 demonstrates that the pre-test scores for all three groups were relatively similar, although the conversation group had slightly higher anxiety levels (DBP) at pre-test time (63.39). The group mean for conversation participants continued to be higher than the other two group means and the entire sample taken altogether (grand mean) throughout the three measurement periods. They also demonstrated the most erratic change in anxiety (DBP) over the three measurement times as Figure 7 clearly illustrates.

The mean score for all subjects on anxiety (DBP) at the pre-test time was 61.12 and at the post-test time it was 61.24 (column means). This increase of only 0.12 from pre-test to post-test time suggested a negligible overall change in anxiety (DBP) for the entire sample taken altogether. The grand mean, or the mean of all subject scores from all groups at both pre-test and post-test times was 61.18. The mean decrease of 3.31 on anxiety (DBP) for all subjects from post-test time (61.24) column mean, to delayed test time (57.93) suggested an overall decrease in anxiety for the entire sample taken together.

The grand mean of both the post-test and delayed test times was 59.59. There was a difference of 3.19 in the mean score for all subjects from pre-test to delayed test times (column means). The difference suggested a decrease in anxiety (DBP) for the entire sample. The grand mean, or the mean of all subject scores from all groups at both pre-test and delayed test times was 59.52.

ANOVA Results: DBP

The descriptive statistical results in table 4.15 demonstrates a wide range in baseline DBP measurements for participants in all three groups. As with the previous measurements, ANOVA was computed for the difference scores on the dependent variable anxiety (DBP). Tables 4.16 and 4.17 show the mean difference scores for the three groups.

The ANOVA results for the pre-test to post-test time period for anxiety (DBP) are summarized in Table 4.18. The results for the post-test to delayed test time period are summarized in Table 4.19. ANOVA was used to test for significant differences in the mean differences between groups and the interaction of groups by time. The level of significance for hypothesis testing was established at 0.05.

Table 4.15

Anxiety Levels (DBP): Descriptive Statistical Results

Anxiety Levels: DBP Pre-test

Group	Mean	Standard Deviation	Number	Range
All Sample	61.12	11.83	21	
Back Massage	60.25	11.37	7	53--81
Conversation	63.39	16.37	7	42-92
No Intervention	59.71	7.74	7	50-96

Anxiety Levels: DBP Post-test

Group	Mean	Standard Deviation	Number	Range
All Sample	61.24	12.60	21	33-96
Back Massage	60.18	11.12	7	35-80
Conversation	66.86	10.57	7	50-96
No Intervention	56.68	8.85	7	33-74

Anxiety Levels: DBP Delayed Test

Group	Mean	Standard Deviation	Number	Range
All Sample	57.93	9.90	21	37-85
Back Massage	56.64	9.92	7	38-85
Conversation	62.28	9.94	7	47-83
No Intervention	54.87	9.71	7	37-84

Table 4.16

Anxiety Level (DBP): Descriptive Statistical Results of Difference Scores

Anxiety: (DBP) Pre-test to Post-test

Group	Mean	Standard Deviation	Number	Range
All Sample	0.13	6.17	21	-11-30
Back Massage	0.04	5.34	7	-11-30
Conversation	3.07	7.58	7	-23-34
No Intervention	-2.71	4.37	7	-26-17

Anxiety Levels (DBP) Post-test to Delayed Test

Group	Mean	Standard Deviation	Number	Range
All Sample	-3.13	5.04	21	-27-19
Back Massage	-3.39	6.25	7	-23-16
Conversation	-4.14	4.60	7	-21-7
No Intervention	1.86	4.62	7	-27-19

Table 4.17

Anxiety Levels (DBP) Group Mean Difference Scores

Group	Pre-test-Post-test	Post-test-Delayed test	Group Mean/ Row Mean	
Back Massage	0.36	-3.39	-1.52	
Conversation	3.07	-4.14	-0.54	
No Intervention	-2.71	1.86	-0.43	
Column Mean	0.24	-1.89	-0.83	(Grand Mean)

Table 4.18

Anxiety Levels (DBP) ANOVA Results: Pre-test to Post-test

Source of Variation	Sum of Squares	D.F.	Mean Squares	F. Ratio	Probability
Between Groups	469.0	2	234.51	1.68	0.21
Within Groups	2507.0	18	139.27		
Total	2976.0	20			

Table 4.19

Anxiety Levels (DBP) ANOVA Results: Post-test to Delayed-test

Source of Variation	Sum of Squares	D.F.	Mean Squares	F. Ratio	Probability
Between Groups	76.0	2	38.01	0.35	0.71
Within Groups	1958.0	18	108.79		
Total	2034.0	20			

There was no statistical difference between the groups at the pre-test to post-test or the post-test to delayed test time periods. This suggests that there was no statistically significant effect of treatment on the groups' anxiety levels as measured by DBP. These results do not lend support for the hypothesis proposed in the study that elderly patients receiving back massage would demonstrate significantly greater decreases in anxiety (DBP) than those who did not receive back massage. These results also do not support the hypothesis that elderly patients would demonstrate a significantly greater sustained response than those who did not receive back massage.

Hypothesis 1d

Elderly patients receiving back massage will display greater decreases in heart rate than either those who receive conversation only or those who receive no intervention.

Heart Rate (HR) Group Mean Scores

Table 4.20 and Figure 8 illustrate the means within groups for the variable anxiety as measured by heart rate (HR) for the pre-test, post-test and delayed test periods. The following trends can be seen in the pre-test to post-test time periods. Subjects who received back massage demonstrated a decrease in anxiety (HR) of 2.04 at post-test time. The mean anxiety score (HR) for the back massage group was 73.98 (row mean). Conversation group participants showed a mean increase of 0.39 on anxiety (HR) at the post-test time.

Table 4.20

Anxiety Levels Heart Rate (HR): Group Mean Scores

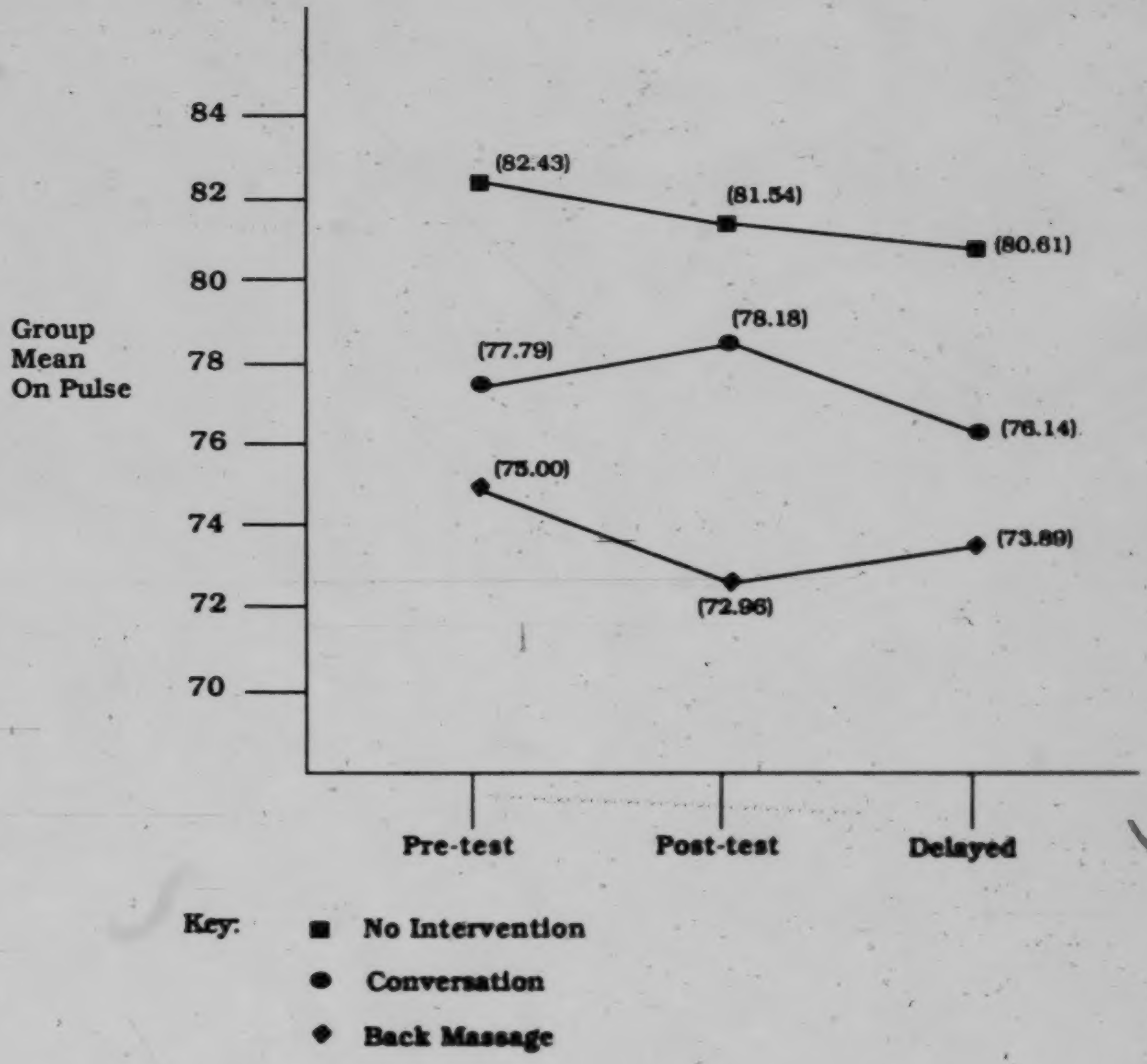
Group	Pre-Test	Post-Test	Group Mean/ Row Mean	
Back Massage	75	72.96	73.98	
Conversation	77.79	78.18	77.99	
No Intervention	82.43	81.54	81.98	
(Column Mean)	78.41	77.56	77.98	(Grand Mean)

Group	Post-Test	Delayed Test	Group Mean/ Row Mean	
Back Massage	72.96	73.89	73.42	
Conversation	78.18	76.14	77.16	
No Intervention	81.54	80.61	81.08	
(Column Mean)	77.56	76.88	77.22	(Grand Mean)

Group	Pre-Test	Delayed Test	Group Mean/ Row Mean	
Back Massage	75	73.89	74.44	
Conversation	77.79	76.14	76.96	
No Intervention	82.43	80.61	81.52	
(Column Mean)	78.41	76.88	77.64	(Grand Mean)

Figure 8

Group Mean Anxiety Levels (HR)



The mean anxiety (HR) score for the conversation group was 77.99 (row mean). Those who received no intervention showed a mean decrease of 0.89 on anxiety (R) scores. The mean anxiety (HR) score for the no intervention group was 81.98 (row mean).

The following trends were seen in the post-test to delayed test time periods. Those who received back massage showed a mean increase of 0.93 on anxiety (HR). The mean anxiety (HR) score for this group was 73.42 (row mean). Those in the conversation group demonstrated a mean decrease of 2.04 on anxiety (HR). The mean anxiety (HR) score for this group was 77.16 (row mean). The subjects in the no intervention group showed a decrease of 0.93 on anxiety (HR) scores. The mean anxiety (HR) score for this group was 81.08 (row mean).

In the pre-test to delayed test time period the following trends are seen in Table 4.20 and Figure 8. Those who received back massage demonstrated a mean decrease of 1.11 on anxiety (HR), with a mean anxiety score of 74.44 (row mean). Those who were in the conversation group showed a mean decrease of 1.65 on anxiety (HR). The mean anxiety (HR) score for these participants was 76.96 (row mean). The no intervention group showed a mean decrease of 1.82 with a mean anxiety (HR) score of 81.52 for the group (row mean).

These trends in the within group means suggest that in the pre-test to post-test time periods those who received back massage demonstrated a decrease in anxiety as measured by heart rate, and those in the no intervention group showed a lesser decrease in anxiety (HR).

Participants in the conversation group demonstrated a slight increase in anxiety (HR) in the pre-test to post-test time period. In the post-test to delayed time period those who received back massage showed a slight increase in anxiety (HR), while the conversation group and no intervention participants showed a decrease in anxiety (HR). In the pre-test to delayed test time period all three groups demonstrated a reduction in anxiety as measured by heart rate.

Figure 8 and Table 4.20 illustrate that the pre-test scores for all three groups varied and that these variations remained consistent throughout the experiment. The groups means (row mean) for each of the three groups remained much the same for the pre-test to post-test, post-test to delayed and pre-test to delayed time periods.

The mean score for all subjects on anxiety (HR) was 78.41 at the pre-test time and 77.56 and at the post-test time (column means). This decrease of 0.85 suggested an overall reduction in anxiety (HR) for the entire sample taken altogether. The grand mean, or the mean of all subject scores from both pre-test to post-test times was 77.98. The mean decrease in anxiety (HR) from post-test time (77.56) (column mean) to delayed test time (76.88) (column mean) suggested an overall reduction of 0.68 in anxiety for the entire sample taken together. The grand mean of both the post-test and delayed test time periods was 77.22. The difference of 1.53 from pre-test to delayed test suggested an overall reduction in anxiety (HR) for the entire sample. The grand mean of these time periods was 77.64.

ANOVA Results: HR

Table 4.21 demonstrates the descriptive statistical results of the heart rate measurements for all the groups. It can be seen from the table that there were large variations in the heart rate for all three groups. Table 4.22 and 4.23 shows the descriptive statistics of the difference scores on which the ANOVA results were computed.

The ANOVA results for the pre-test to post-test time periods are summarized in table 4.24, and the post-test to delayed test results are in table 4.25.

ANOVA was again used to test for significant differences in the mean differences between groups and the differences from pre to post and post to delayed time periods. The level of significance was established at 0.05 for hypothesis testing.

There was no statistical difference between the groups at the pre-test to post-test or at the post-test to delayed test time periods. This suggests that there was no statistically significant effect of treatment on the groups' anxiety levels as measured by heart rate.

These results do not support the hypothesis that elderly patients receiving back massage would demonstrate significantly lower anxiety (HR) levels than those who do not receive back massage. Nor do these results support the hypothesis that elderly patients receiving back massage would demonstrate a significantly greater sustained response than those who did not receive back massage.

Table 4.21

Anxiety Levels (HR): Descriptive Statistical Results

Anxiety Levels: (HR) Pre-test

Group	Mean	Standard Deviation	Number	Range
All Sample	78.41	13.86	21	50-131
Back Massage	75	13.84	7	50-100
Conversation	77.79	8.67	7	65- 97
No Intervention	82.43	18.45	7	68-131

Anxiety Levels: (HR) Post-test

Group	Mean	Standard Deviation	Number	Range
All Sample	77.56	13.02	7	50-129
Back Massage	72.96	13.52	7	50- 94
Conversation	78.18	8.75	7	64- 97
No Intervention	81.54	16.32	7	68-129

Anxiety Levels: (HR) Delayed Test

Group	Mean	Standard Deviation	Number	Range
All Sample	76.88	13.92	21	41-132
Back Massage	73.89	15.07	7	41-100
Conversation	76.14	8.75	7	60- 96
No Intervention	80.61	16.90	7	63-132

Table 4.22

Anxiety Levels (HR): Descriptive Statistical Results of Difference Scores

Anxiety: (HR) Pre-test to Post-test

Group	Mean	Standard Deviation	Number	Range
All Sample	-1.00	1.24	21	-48-9
Back Massage	-2.00	4.71	7	-48-8
Conversation	0.39	1.83	7	-5-9
No Intervention	-1.39	3.12	7	-34-5

Anxiety Levels (HR) Post-test to Delayed Test

Group	Mean	Standard Deviation	Number	Range
All Sample	0.82	1.48	21	-12-42
Back Massage	1.25	4.93	7	-9-42
Conversation	2.04	1.64	7	-7-4
No Intervention	-0.82	2.10	7	-12-10

Table 4.23

Anxiety Levels (HR) Group Mean Difference Score

Group	Pre-test-Post-test	Post-test-Delayed test	Group Mean/ Row Mean	
Back Massage	-2.00	1.25	-0.38	
Conversation	0.39	-2.04	-0.83	
No Intervention	-1.39	-0.82	-1.11	
Column Mean	-1.00	-0.54	-0.77	(Grand Mean)

Table 4.24

Anxiety Levels (HR) ANOVA Results: Pre-test to Post-test

Source of Variation	Sum of Squares	D.F.	Mean Squares	F. Ratio	Probability
Between Groups	86.64	2	43.32	0.92	0.41
Within Groups	843.90	18	46.88		
Total	930.50	20			

Table 4.25

Anxiety Levels (HR) ANOVA Results: Post-test to Delayed-test

Source of Variation	Sum of Squares	D.F.	Mean Squares	F. Ratio	Probability
Between Groups	154.60	2	77.29	1.84	0.19
Within Groups	755.10	18	41.95		
Total	909.60	20			

Hypothesis 2

Elderly patients receiving back massage will demonstrate a significantly greater sustained relaxation response than either those who receive conversation only or those who receive no intervention.

STAI Group Mean Scores

Table 4.26 summarizes the mean group scores for the dependent variable anxiety as measured by the A-State Self-Evaluation Questionnaire (STAI), for the pre-test and delayed test time periods. The questionnaire was not given at the immediate post-test time so as to not disturb subjects following treatment. It was felt that questioning patients at that time could serve to affect the physiological measurements.

Figure 9 presents a graphic representation of the group mean scores summarized in Table 4.26. From Table 4.26 and Figure 9, the following trends in the means within groups for the variable anxiety (STAI) can be seen. Participants who received back massage demonstrated a mean decrease of 5.19 on anxiety (STAI) scores from the pre-test to delayed test time (pre-test mean: 30.67, delayed test mean: 25.48). The mean depression score when both tests were averaged together was 30.91 (row mean). Conversation group participants showed a mean decrease of 1.62 on anxiety scores from the pre-test to delayed test. (Pre-test = 34.57, post-test = 32.95), with the mean anxiety score (average of pre and delayed test) was 33.76 (row mean). Those who received no intervention demonstrated

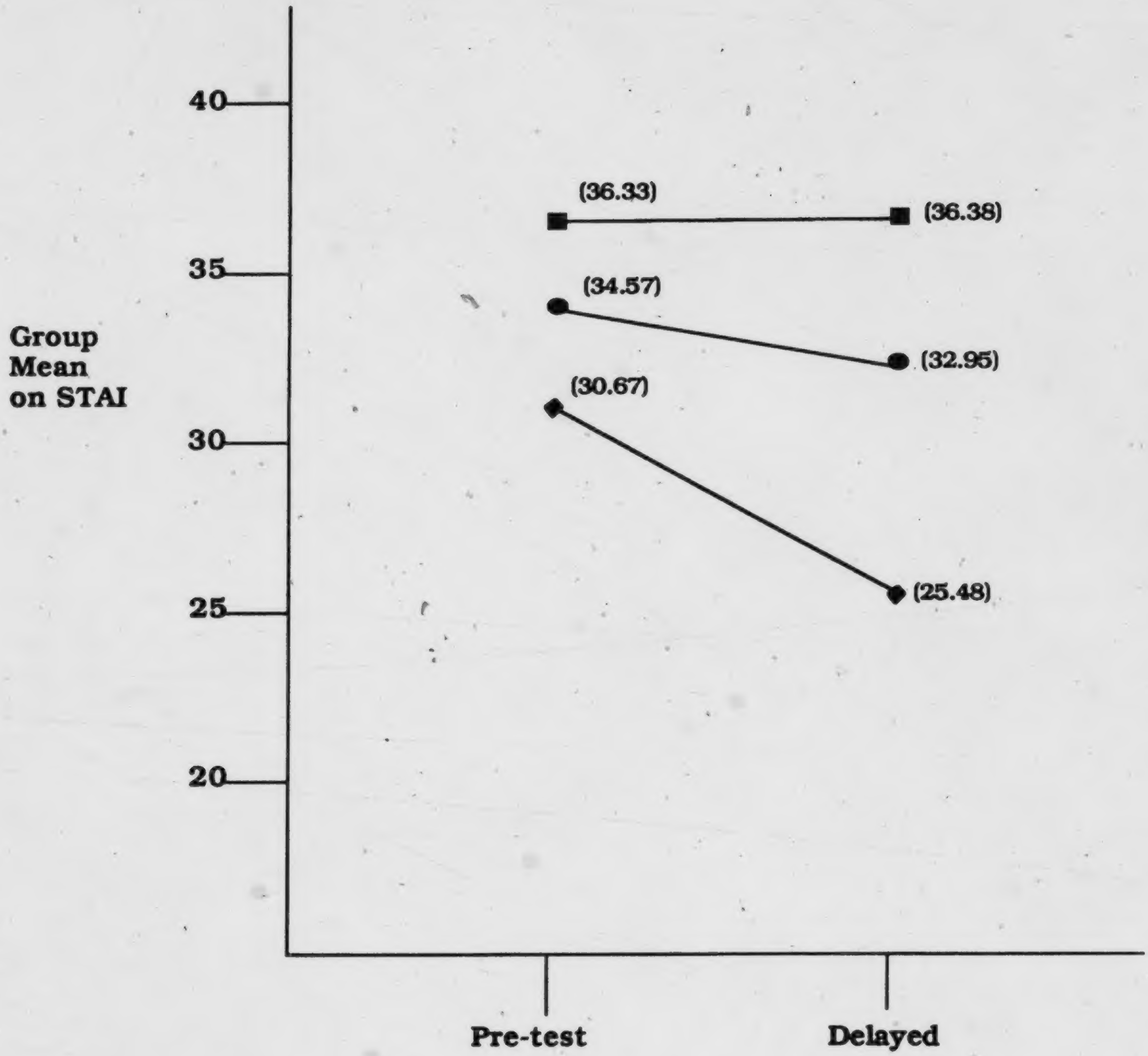
Table 4.26

Anxiety Levels (STAI): Group Mean Scores

Group	Pre-Test	Delayed Test	Group Mean/ Row Mean
Back Massage	30.67	25.48	28.07
Conversation	34.57	32.95	33.76
No Intervention	36.33	36.38	36.35
(Column Mean)	33.86	31.60	32.73 (Grand Mean)

Figure 9

Group Mean Anxiety Levels (STAI)



Key:
- ■ No Intervention
- ● Conversation
- ◆ Back Massage

virtually no change (0.05) from pre-test to delayed test (pre-test = 36.33, delayed test = 36.38). The mean anxiety score for the no intervention group was 36.35 (row mean).

These tends in the within group means suggested that from the pre-test to delayed test time period, those who received back massage experienced a significant reduction in anxiety (STAI). Those in the conversation group experienced only a slight reduction in anxiety (STAI). Subjects who received no intervention showed virtually no change in anxiety (STAI) levels.

Table 4.26 and Figure 9 illustrate the following: the pre-test group means for all three groups were different, with the back massage group being considerably lower on anxiety (STAI) than the other two groups, and these differences become larger between delayed-test STAI group means. This indicated that there may have been a differential effect of treatment between groups on the dependent variable of anxiety. The mean score for all subjects on the STAI was 33.86 and at the delayed test time was 31.60 (column means). This mean decrease in anxiety scores of 2.26 suggested a slight overall decrease in anxiety for the entire sample taken together. The grand mean, or the mean of all subject scores from all groups at both pre and delayed test times, was 32.73.

ANOVA Results: STAI

Table 4.27 demonstrates the descriptive statistical results of the STAI measurements for all three groups. Variations in STAI scores can be seen in this table. Table 4.28 shows the descriptive statistics of the difference scores on which the ANOVA results were computed.

The ANOVA results for the pre-test to delayed test time periods are summarized in Table 4.29. ANOVA was used to test for significant differences in the mean differences between groups and the differences from pre to delayed time periods. The significance level for hypothesis testing was established at 0.05. There was a statistically significant difference between the groups at the pre-test to delayed test time period as evidence by a probability of 0.006.

This establishes that there was a statistically significant effect of treatment on the groups' anxiety levels as measured by STAI.

Contrasts of Specific Means

The relevant Scheffé comparisons for the pre-test to delayed test for the dependent variable anxiety (STAI) are summarized in table 4.30. The level of significance for hypothesis testing was once again established at 0.05. The Scheffé comparisons demonstrate that there was no statistically significant difference between the conversation and no intervention groups ($P \leq 0.465$) or between the conversation and back massage groups ($P \leq 0.085$). There was, however, a statistically significant difference between the no

Table 4.27

Anxiety Levels (STAI): Descriptive Statistical Results

Anxiety Levels: (STAI) Pre-test

Group	Mean	Standard Deviation	Number	Range
All Sample	33.86	2.89	21	20-49
Back Massage	36.33	5.11	7	20-40
Conversation	34.57	5.74	7	24-46
No Intervention	30.67	7.27	7	27-49

Anxiety Levels: (STAI) Delayed Test

Group	Mean	Standard Deviation	Number	Range
All Sample	31.60	5.57	21	20-52
Back Massage	25.48	5.06	7	20-36
Conversation	32.95	6.14	7	24-42
No Intervention	36.38	7.63	7	28-52

Table 4.28

Anxiety Levels (STAI): Descriptive Statistical Results of Difference Scores

Anxiety: (STAI) Pre-test to Delayed-test

Group	Mean	Standard Deviation	Number	Range
All Sample	-1.65	3.39	21	
Back Massage	-5.19	3.41	7	-13-0
Conversation	-1.33	6.18	7	-11-11
No Intervention	1.57	4.77	7	-6-14

Table 4.29

Anxiety Levels (STAI) ANOVA Results: Pre-test to Delayed-test

Source of Variation	Sum of Squares	D.F.	Mean Squares	F. Ratio	Probability
Between Groups	377.60	2	188.78	6.86	0.006
Within Groups	495.50	18	27.53		
Total	873.10	20			

Table 4.30

Anxiety Levels (STAI): Scheffé Comparisons: Pre-test to Delayed-test

Comparison	Contrast	F-ratio	Probability
Conversation to No Intervention	-2.05	0.80	0.465
Conversation to Back Massage	3.86	2.84	0.085
No Intervention to Back Massage	5.90	6.65	0.007

intervention and back massage group with a probability of 0.007. Although not statistically significant, the difference between the back massage group and the conversation group is approaching the established significance level of 0.05.

The finding of a statistically significant difference between the mean STAI score for the back massage and no intervention group lends some support to hypothesis 2 in this study. This hypothesis proposed that subjects receiving back massage would demonstrate a significantly greater sustained relaxation response than those who did not receive back massage. However, because the back massage treatment did not appear to have a statistically significantly greater effect than the conversation treatment, the hypothesis is only partially supported.

Summary of the Results

1) Both the back massage and conversation groups showed slight decreases in mean anxiety levels as measured by EMG in the pre to post time period and larger decreases in the post to delayed time period. The no intervention group showed larger decreases in mean anxiety levels in the pre to post time period than the other two groups and an almost identical decrease in the post to delayed time period. This decrease was substantially less than the other two groups showed in the same time period.
2) The statistical analysis of EMG results revealed that the treatments had no significant effect in the immediate post

treatment period, but a significant effect between the treatment group and no intervention group was evident in the delayed time period. Further analysis revealed that the difference between the back massage and conversation treatment were not significant.

3) There was a continuous reduction in mean anxiety as measured by SBP for the back massage group as compared to the conversation group who demonstrated an immediate and delayed increase in anxiety. The no intervention group demonstrated a smaller immediate decrease and a delayed increase in anxiety (SBP) as compared to the back massage group.

4) Although the effect of the back massage treatment on anxiety (as measured by SBP) approached significance (0.11) in the immediate post treatment period, there was no significant difference found between the back massage treatment group and the other two groups in either the immediate post treatment period or in the delayed measurement period.

5) There was no consistent trend demonstrated between group means when DBP or HR were used as measurements of anxiety and no significant differences were found between groups in the immediate post-treatment period or in the delayed period.

6) There was a statistically significant difference found in the mean anxiety score (STAI) between the back massage and no intervention group. No statistical significant difference was found between the conversation and the no intervention or back

massage group. However, the difference in mean anxiety (STAI) between the back massage group and the conversation group approached statistical significance.

7) With the exception of the mean DBP which showed no change from pre to post-test and the HR which increased from post to delayed test, there was a nonsignificant decrease in all variables in the back massage group from pre-test to post-test and from post-test to delayed test.

The findings from this study are reflective of the inconsistent and inconclusive findings from other studies using similar indices to measure the effects of back massage. For example, using a repeated measures analysis of variance, Bauer & Dracup (1987) found that a six minute back massage had no significant effect on EMG, SBP, DBP, or HR in coronary patients. On the other hand, Longworth (192), found a significant increase in the mean, SBP, a nonsignificant decrease in mean HR and EMG scores immediately following a three minute back massage. She also found a non significant decrease in SBP and DBP, a significant increase in HR, and a nonsignificant increase in EMG scores following a six minute back massage. No change was found in SBP, DBP or HR but there was a significant decrease in EMG scores in the ten minute delayed response period. As in the present study STAI scores in Longworth's study decreased significantly from pre-test to the end of the ten minute delayed response period ($t(31) = 5.52$, $p < .0001$). However, Longworth's study as conducted in a laboratory setting with nursing students, unlike the population and setting in this study.

The findings of Fakouri & Jones (1987), in a study of elderly nursing home patients, are again not consistent and do not support the findings from this study. Fakouri & Jones found significant decreases in SBP and HR following a three minute back massage. No significant change occurred in DBP until day three of treatment.

Trends found by Barr & Taslitz (1970) support many of the trends observed in the present study. Although their sample of ten college students was not comparable to the sample used in this study and their data was not subjected to statistical analysis, a comparison of their results to those found here is warranted. In the Barr & Taslitz study, subjects were used as their own controls and mean changes in autonomic function were measured and compared to mean changes following back massage. During control sessions subjects showed a decrease in mean SBP, DBP and HR five minutes after the control period began. A further decrease was seen in these three measurements in the delayed period (ten minutes later). Similarly, in the present study the mean SBP, DBP and HR decreased in the control group from pre-test to post-test period and a further decrease was seen in the mean DBP and HR. However, contrary to Barr & Taslitz' findings, the mean SBP increased during the delayed period. During the back massage session Barr & Taslitz found a decrease in mean SBP and DBP and a mean increase in HR from pre-test to post-test. At the delayed period the mean SBP and HR increased and the mean DBP decreased only slightly. These results are somewhat contrary to the findings in the present study where there was a decrease in mean SBP and HR and no change in DBP from pre-test to post-test in the massage group participants. In the delayed period a decrease in both SBP and DBP occurred, whereas, in the Barr & Talsitz study an increase in HR occurred.

It should be noted that the analysis was carried out on pre to post and post to delayed periods. With the exception of STAI scores, no analysis was done on the pre to delayed period of time. In retrospect, the latter analysis may well have produced results which could have illuminated findings from this study.

Interpretation of the Findings

The inconclusive and inconsistent statistical results found in this study are not surprising considering the physiological variables utilized. Although participants receiving back massage demonstrated decreases in anxiety as indicated by EMG, SBP, DBP, HR and STAI, these decreases were only significant when compared to the no intervention group on EMG and STAI at the delayed test period. The decrease in EMG scores indicates that the delayed effect of back massage may have been to lower generalized muscle tension, suggesting a lowering of psycho-emotional and somatic arousal in the rest period following back massage. Lowered psycho-emotional arousal is further substantiated by the results of the STAI which indicated that back massage was perceived as relaxing by subjects. These results are further substantiated by verbal reports from subjects who received back massage treatments; this information came from the anecdotal records of the treatment sessions kept by the researcher. All subjects reported pleasurable feelings and feelings of relaxation during and after each back massage. One participant claimed that he had been feeling very anxious prior to the back massage due to pending divorce proceedings. Following each back massage, this individual stated that he felt much more relaxed. Each following day he repeated that he had slept better the previous night than he had in over a year.

Findings in this study indicated that conversation participants also felt more relaxed following the intervention than prior to the conversation. It was evident from the willingness and enthusiasm of the participants that they felt they were benefiting from just being in the study. Many of the physiological indicators of anxiety used in this study showed similar changes in the conversation group and the back massage group, although these changes were not consistent.

There was a lack of statistically significant differences between the back massage group and the conversation group in this study. This could have been due to a number of factors. 1) The large variability in physiological indicators used to measure anxiety could have served to reduce any identifiable differences in the statistical analysis. 2) The large individual variability among each of the groups may indicate that there may have been a number of factors influencing the measurements. One such factor might well be the use of cardiovascular medications which may have had an effect on heart rate and blood pressure. It is unlikely that the same effect would have occurred with EMG and STAI. 3) The conversation group participants were able to choose the topics of conversation and thus could choose ones that may have been conducive to reducing anxiety levels. Conversely, the controlled nature of the back massage intervention (the subjects were not able to dictate what was most helpful) may have undermined the true effects of back massage. In other words, subjects were not given the opportunity to request what type of massage may have been most relaxing to them at that particular moment or on any particular day, whereas conversation participants were able to choose topics which were important to them on any given day.

The variability in the physiological results from this study serves to substantiate the difficulty other researchers have had in accurately measuring the effects of back massage. Of other studies found, none have produced consistent results, nor have the findings been consistent between researchers. This could be a reflection of the large variations that exist among individuals and the rapid changes that occur physiologically within individuals. In this study, the physiological changes did not consistently reflect what participants were saying they were feeling. For example, several times during back massage treatments, although subjects would indicate verbally that they were feeling relaxed, the EMG, blood pressure and heart rate recordings did not always indicate an associated change. Some of these inconsistencies may have been caused by sudden movements, changes in blood flow due to massage or individual muscular or circulation problems caused by disease processes. Certainly other physiological needs or emotional states besides anxiety could have affected physiological changes.

Unlike the physiological measurements, the STAI was not likely affected by such factors and hence is probably a more stable measurement of anxiety levels. The positive comments from participants also seemed to be closely related to their responses on the STAI. For the most part, participants' statements that they felt more relaxed following treatments than before treatments were reflected in changes in STAI scores before and after back massage. If it is true that arts/humanities are concerned with a person's emotional responses to experiences (Watson, 1981, p. 247), then perhaps the art of nursing cannot be adequately measured by scientific physiological measurements. Further, if the 'active search and discovery of reaching out and making contact with another human being is a truly artistic endeavor' (Watson, 1981, p. 245), then more emphasis must be placed on how patients are affected emotionally by the physical contact they receive from nurses.

Chapter V

Conclusions and Recommendations

Conclusions

The objective of this study was to evaluate the effectiveness of back massage as a nursing intervention. This study focused on the physiological and psychological effects of back massage on the anxiety levels of an elderly population. Due to the large variabilities in the physiological measurements used as indicators of anxiety, the results are inconsistent and inconclusive. It was apparent that back massage did have some effect on decreasing anxiety levels, particularly as measured by the psychological indicator (STAI). However neither of the two hypotheses were fully supported based on empirical evidence provided by the results.

Statistical analysis demonstrated that there were no significant decreases in anxiety (immediate or delayed testing) that could be attributed to the back massage treatments as measured by both physiological and psychological measurements. The results did show that the back massage and conversation groups both experienced a decrease in anxiety; however, further statistical testing did not show a significant difference between the groups. Based on these results, both hypotheses must be rejected. The findings did not fully support the hypothesis that elderly patients receiving back massage will indicate significantly lower levels of anxiety than either those who receive conversation only or those who receive no intervention. Nor did the findings fully support the hypothesis that elderly patients receiving back massage will demonstrate a significantly greater sustained relaxation response than those who receive conversation only or those who receive no intervention.

Physiological variability, small sample size and differences between groups may have contributed to some of the difficulties encountered in obtaining accurate physiological changes which may have reflected effects of the treatment. The psychological measurement (STAI) appeared to provide a more accurate measurement of changes in anxiety levels and were more consistently reflective of how participants verbalized they felt. Recommendations for further study are given following limitations of the study and include consideration of the factors mentioned here.

Limitations of the Study

1. Despite efforts to strengthen the internal validity of the study, through study design and constancy of research conditions (eg, the environment, time, date collector, equipment, back massage techniques), some threats to internal validity may have existed.
2. In spite of probability sampling, factors such as small sample size and group differences, such as age differences between groups, (no statistical analysis done to determine group similarities) suggest that caution is necessary when attempting to compare the results of this study to a larger population.

This sample may not be representative of any larger elderly population.

3. There may have been some threats to external validity in the study. Firstly, the "Hawthorne effect" may have occurred. Knowledge of participation in this study may have interfered with the effect of the treatments on group anxiety levels. If this effect existed it is likely that it occurred among all three groups in a similar fashion as each group had similar knowledge regarding the study. Secondly, and perhaps more serious, there may have been experimenter effects. The researcher completed all procedures including treatments, pre, post, and delayed measurement tests. Further, the close contact of the researcher with the subjects over the entire experimental period may have produced an effect on the dependent variable anxiety merely by the researcher's presence. The final threat may have involved influences caused by the instruments used. Attempts to nullify these effects were made by utilizing standard equipment which had been tested for both reliability and validity. These same measurement devices were used on each subject in a consistent manner. Despite these attempts at standardization, some variability may have existed with continuous use.

Implications for Nursing

Although this study did not provide evidence of statistically significant effects of back massage as compared to conversation alone, trends within the study suggest directions for nursing. These trends indicated that all measures except heart rate showed a decrease with back massage and suggest that back massage did have an effect in reducing anxiety. There were also indications that conversation with participants had a similar, although more inconsistent effect on the reduction of anxiety in this population. These results were not demonstrated in participants who had no intervention. This suggests that although statistically the results may be inconclusive, the effects of human touch and interaction on the elderly population in the study were very real factors. Although there may be inconclusive evidence of the benefits of back massage in terms of empirical indicators of anxiety, the elderly may benefit in less obvious ways such as feeling accepted and comforted and that someone cares about them.

The positive nature of patients' comments provided clinical insight into how relaxed and rested subjects felt following back massage. The significance of these subjective responses must not be underestimated and consequently it would seem inappropriate not to incorporate a nursing intervention so highly valued by patients into nursing practice.

Interactions with elderly should be promoted in nursing practice and emphasized in nursing education and facilities by nurse administraters. It is recognized that nursing shortages and the emphasis on technical skills and equipment may diminish the ability of nurses to spend time with patients. However, the value of human contact must not be undervalued in the presence of technical progress. The expressions of appreciation that were demonstrated by the individuals in this study were clearly indicators of how much importance they placed on contact with nurses. It is clear that human contact was synonomous with feeling cared for and cared about as human beings. The short time periods spent with each individual did not seem to diminish the quality of the interaction or the importance of the experience for the patients. The fact that some participants claimed they slept better and required less sedation for sleep indicates that not only can interaction with patients (through conversation or back massage) be less time consuming than other measures, it may also be less costly in the long run. It must be emphasized that when there is no more that technology can offer the elderly, nurses can offer themselves as well as their hands.

With the trend toward an interdisciplinary approach to care of the elderly, nurses are frequently coordinators of care. Within this role they have the opportunity and expectation to give direction to other team members. Therefore nurses should encourage increased interaction with patients through touch and communication.

Recommendations for Further Study

There is a need for further investigation of the effects of back massage as a nursing intervention. The study should be replicated to determine the accuracy of the findings. Recommendation for further study include: 1) use of larger samples to reduce the effects of variability in measurements; 2) the effectiveness of back massage on different types of elderly patients should be investigated, such as cognitively impaired elderly patients. However with this group, it is likely that only physiological measurements could be used. This would then facilitate the generalizability of any significant results; 3) The effects of back massage should be tested on groups other than an elderly population, for example children, palliative care patients, etc); 4) Studies should be done to investigate other effects of back massage besides anxiety, for example, self-esteem or depression.

Summary

Patients frequently complain about the quality of care they receive in hospitals and the lack of a caring attitude demonstrated by nurses. In particular, concern has often been expressed about the quality of life experienced by elderly residents of long-term care facilities. Much of the dissatisfaction expressed may be due to the custodial type of care provided and lack of contact from nursing staff. Custodial care may provide for the physical needs and safety of residents but ignores their social and psychological needs.

The back rub has been used for years by the nursing profession for a variety of purposes, one of which being relaxation. With the trend towards high technology in health care, "hands-on" techniques such as back massage have largely been forgotten and replaced with machines and medications. In populations such as the elderly who require institutionalization, anxiety is often present and is compounded with social isolation from lack of human contact. Back massage may be an effective non-invasive measure for promoting relaxation and improving contact with patients, yet seems to be seldom used. Little evidence exists to provide concrete benefits of this technique which is easy to administer and requires very little time to do. The objective of this study was to investigate the effects of back massage on elderly institutionalized patients. Specifically the objective was to measure the effects of back massage on anxiety levels using physiological and psychological measurements.

The findings in the study did not support the hypothesis that would have demonstrated a statistically significant difference between the back massage treatment and the other two treatments. However, subjects in the back massage group did demonstrate a reduction in anxiety levels as indicated by a decrease in EMG, SBP, DBP and STAI. Heart rate decreased immediately following back massage and increased in the delayed time period. There was no significant difference found between the effects of back massage and the effects of conversation alone. The conversation appeared to also have a significant effect on anxiety as compared to no intervention.

In spite of random sampling techniques dissimilarities were apparent in the groups prior to treatment. Lack of statistical analysis to determine the effects of such factors as age, medications, disease and gender and the large variability in physiological indices within individuals and between groups are limitations to the study. Implications for nursing practice, nursing education and nursing administration were discussed.

Recommendations, such as the need for replication studies, the need to investigate other effects of back massage and the need to investigate effects of back massage in other populations were also discussed.

References

Aguilera, D.C. (1967). Relationship between physical contact and verbal interaction between nurses and patients. Journal of Psychiatric Nursing, 5, 5-21.

Amacher, N.J. (1973). Touch is a way of caring and a way of communicating with an aphasic patient. American Journal of Nursing, (5), 852-854.

Ashton, J. (1984). In your hands. Nursing Times, 5(9), 54.

Balshan, I.D. (1962). Muscle tension and personality in women. Archives of General Psychiatry, 7, 436-447

Barnett, K. (1972a). A survey of the current utilization of touch by health team personnel with hospitalized patients. International Journal of Nursing Studies, 9(4), 102-110.

Barnett, K. (1972b). A theoretical construct of the concepts of touch as they relate to nursing. Nursing Research, 21(2), 102-110.

Barr, J.S. & Taslitz, N. (1970). The influence of back massage on autonomic functions. Physical Therapy, 50, 1679-1691.

Basmagian, J.V. & Deluca, C.J. (1985). Muscles alive: Their functions revealed by electromography. Williams & Wilkins: London.

Bauer, W.C. & Dracup, K.A. (1987). Physiologic effects of back massage in patients with acute myocardial infarction. Focus on Critical Care, 14(6), 42-46.

Benson, H., Beory, J.F., Carol, M.P. (1974). The relaxation response. Psychiatry, 37, 37-46.

Benson, H., Rosner, B., Marzetta, B. (1974). Decreased blood pressure in pharmacologically treated hypertensive patients who regularly elicited the relaxation response. Lancet, 1, 289-292.

Boguslawski, M. (1979). The use of therapeutic touch in nursing. The Journal of Continuing Education in Nursing, 10(4), 9-15.

Boguslawski, M. (1980). "Therapeutic Touch: A facilitator of pain relief." Topics in Clinical Nursing, 2(18), 27-37.

Borovec, T.D. & Fowles, D.C. (1973). Controlled investigation of the effects of progressive and hypnotic relaxation on insomnia. Journal of abnormal Psychology, 82(1), 153-158.

Bowlby, J. (1958). The nature of the child's tie to his mother. International Journal of Psychoanalysis, 39, 350-373.

Bowlby, J. (1967). Psychopathology of anxiety. In M.H. Lader (Ed.), Studies of Anxiety. Ashford Kent: Headly Brothers Ltd. 80-86.

Brown, B. (1977). Stress and the art of biofeedback. New York: Bantam Books, Inc.

Bulbrook, M.J. (1984). Bulbrook's model of therapeutic touch: One form of health and healing in the future. The Canadian Nurse, 12, 30-34.

Burnside, I.M. (1973). Touching is talking. American Journal of Nursing, 73(12), 2060-2063.

Burnside, I.M. (1981). The therapeutic use of touch. In I.M. Burnside (Ed.), Nursing and the Aged. McBraw-Hill Book Co: New York.

Campbell, D.T. & Stanley, J.C. (1963). Experimental and Quasi-experimental designs for research. Boston: Houghton-Mifflin Company.

Canadian Nurses Association (1958). Code of ethics for Nursing. Ottawa: Canadian Nurses Association.

Cattell, R.B. & Sheier, I.H. (1961). The meaning and measurement of neuroticism and anxiety. New York: Ronald Press.

Clark, P.E. & Clark, M.J. (1984). Therapeutic Touch: Is there a scientific basis for the practice? Nursing Research, 33(1), 37-41.

Cohen, S.S. (1987). The magic of touch. New York: Harper & Row Publishers, Inc.

Copstead, L.C. (1980). Effects of touch on self-appraisal and interaction appraisal for permanently institutionalized older adults. Journal of Gerontological Nursing, 6(12), 747-752.

Critikon (1987). Dinamap^{TM} Vital Signs Monitor Model 8100 Service Manual. Critikon Canada: Markham.

de Weaver, M.K. (1977). Nursing home patients' perceptions of nurses' affective touching. The Journal of Psychology, 96, 163-171.

Dimond, M. (1980). Caring: Nursing's Promise to the elderly. Geriatric Nursing, 1(3), 196-198.

Division of Educational Research Services. (1984). ANOV26 Computer Program Documentation. Faculty of Education. The University of Alberta. Unpublished Documentation.

Dominion, J. (1971). The psychological significance of touch. Nursing Times, 67(7), 86-89.

Downing, G. (1972). The massage book. New York: Random House.

Durr, C.A. (1971). Hands that help...but how? Nursing Forum, 10(4), 393-401.

Estabrooks, C. (1987). Touching behaviors of ICU nurses. Unpublished master's thesis. University of Alberta.

Elizabeth, Sr. R. (1966). Sensory stimulation techniques. American Journal of Nursing, 66, 281-285.

Fakouri, C. & Jones P. (1987). Relaxation Rx: The slow stroke back rub. Journal of Gerontological Nursing, 13(2), 32-35.

Fitzsimons, V.M. (1983). The aged integument: a sensitive and complex system. Topics in Clinical Nursing, 7, 32-38.

Frank, L.K. (1957). Tactile communication. Genetic Psychological Monographs, 56, 209-255.

Goodykoontz, L. (1979). Touch: attitude and practice. Nursing Forum, 18(10), 4-17.

Grad, B. (1975). Some biological effects of the laying-on of hands: A review of experiments with animals and plants. Human Dimensions, 52, 27-38.

Grad, B., Cadoret, R.J., Paul, G.I. (1961). An unorthodox method of wound healing in mice. International Journal of Parapsychology, 3, 5-24.

Grossman, W.I. & Weiner, H. (1966). Some factors affecting the reliability of electromyography. Psychomatic Medicine, 28, 78-83.

Hardy, J. (1975). The importance of touch for patient and nurse. Journal of Practical Nursing, 25(6), 26-27.

Haynes, S.N., Moseley, D., & McGowan, W.T. (1975). Relaxation training and biofeedback in the reduction of frontalis muscle tension. Psychophysiology, 12, 547-552.

Heidt, P. (1981). Effect of therapeutic touch on anxiety level of hospitalized patients. Nursing Research, 30, 32-37.

Hollinger, L. (1980). Perception of touch in the elderly. Journal of Gerontological Nursing, 6(12), 741-746.

Holmes, P. (1986). Fringe benefits. Nursing Times, 82(22), 20-22.

Hopper, L. & McWilliams, P.A. (1967). (Eds.). Care of the Nursing-Home Patient. Boston: Little, Brown.

Huss, J. (1977). Touch with care or a caring touch. American Journal of Occupational Therapy, 31(8), 11-18.

Jacobsen, E. (1939). Variation of blood pressure with skeletal muscle tension and relaxation. Ann International Medicine, 12, 1194-1212.

Jacobsen E. (1940). Variation of blood pressure with skeletal muscle tension and relaxation, II, the heart rate. Ann. International Med, 13, 1619-1625.

Johnson, B.S. (1965). The meaning of touch in nursing. Nursing Outlook, 13, 59-60.

Jourard, S.M. (1964). The transparent self. New York: Van Nostrand.

Jourard, S.M. (1966). An exploratory study of body accessibility. Br. Journal of Soc. Clin. Psychol., 5, 221-231.

Kaufman, M.A. (1964). Autonomic Responses as related to nursing comfort measures. Nursing Research, 13, (11, 45-55).

Keller, E. & Bzdek, V.M. (1986). Effects of therapeutic touch on tension headache pain. Nursing Research, 35(2), 101-105.

Krieger, D. (1975). Therapeutic touch: The imprimatur of nursing. American Journal of Nursing, 75(5), 784-787.

Krieger, D., Peper, E, Ancoli, S. (1979). Physiologic indices of therapeutic touch. American Journal of Nursing, 79(4), 660-662.

Lader, M.H. (1967). Psychophysiological aspects of anxiety. In M.H. Lader (Ed.). Studies of Anxiety. Headley Brothers Ltd: Ashford Kent. pp.53-61.

Langland, R.M. & Panicucci. (1980). Effects of touch on communication with elderly confused clients. Journal of Gerontological Nursing, 8(3), 152-155.

Lenman, J.A.R. & Ritchie, A.E. (1983). Clinical Electromyography. Pitman Publishing Inc.: Marshfield Massachuesetts.

Longworth, J.C.D. (1982). Psychophysiological effects of slow stroke back massage in normotensive females. Advances in Nursing Science, 6, 44-61.

Lynch, J. (1970). Psychophysiology and development of social attachment. 15(4), 240.

Malmo, R.B. (1957). Anxiety and behavioral arousal. Psychological Review, 64, 276-287.

Malmo, R.B. & Shagass, C. (1949). Physiologic studies of reaction to stress in anxiety and early schizophrenia. Psychosomatic Medicine, 11, 9-24.

Martuza, V.R. & Kallstrom, D.W. (1974). Validity of the state-trait anxiety inventory in an academic setting. Psychological Reports, 35, 363-366.

McCorkle, R. (1974). Effects of touch on seriously ill patients. Nursing Research, 23, 125-132.

McDonald, R.J. & Spielberger, C.D. (1983). Measuring anxiety in hospitalized geriatric patients. In C.D. Spielberger and R. Diaz-Guerrero (Eds.). Cross-cultural anxiety (Vol. 2). Washington, DC: Hemisphere/Wiley.

Mercer, D.S. (1966). Touch: Comfort or threat. Perspectives of Psychiatric Care, 4, 20-25.

Michelesen, D. (1978). Giving a great back rub. American Journal of Nursing, 78, 1197-1199.

Miller, L. (1979). An explanation of therapeutic touch using the science of unitary man. Nursing Forum, 18, 278-287.

Montagu, A. (1971). Touching - the Human Significance of the skin. Columbia University Press: New York.

Morse, J.M. (1983). An ethnoscientific analysis of comfort: A preliminary investigation. Nursing Papers, 15(1), 6-19.

Munro, B.H. (1981). Differences among group means: Multifactorial analysis of Variance. In B.H. Munro, M.A. Visintainer, & E.B. Page (Eds.). Statistical Methods for Health Care Research. Philadelphia J.B. Hippencott Company. pp.200-217.

Naisbitt, J. (1982). Megatrends: Ten new directions transforming our lives. New York: Warner Books, Inc.

Pagano, R.R. (1986). Understanding statistics in behavioral sciences. West Publishing Company: St. Paul.

Patel, C. (1975). 12-month follow-up of yoga and biofeedback in the management of hypertension. Lancet, 1, 62-65.

Patterson, R.L., O'Sullivan, M., & Spielberger, C.D. (1980). Measurement of state and trait anxiety in elderly mental health clients. Journal of Behavioral Assessment, 2, 89-97.

Pfeiffer, E. (1975). A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. Journal of the American Geriatrics Society, 23(10), 433-441.

Politt, D.F. & Hungler, B.P. (1978). Nursing Research: Principles and Methods. Toronto: J.B. Lippincott Company.

Preston, T. (1973). Caring for the aged when words fail. American Journal of Nursing, 73, 2064-1066.

Quinn, J.F. (1983). Therapeutic Touch as energy exchange: testing the theory. Advances in Nursing Science, 9, 42-49.

Randolf, G. (1984). Therapeutic and physical touch: Physiological response to stressful stimuli. Nursing Research, 33(1), 25-31.

Reinking, R.H. & Kohl, M.L. (1975). Effects of various forms of relaxation training on physiological and self-report measures of relaxation. Journal of Consulting and Clinical Psychology, 43, 595-600.

Robb, I.H. (1910). Nursing: Its principles and practice for hospitals and private use. Toronto: The J.F. Hartz Co. (Ltd.).

Rubin, R. (1963). The maternal touch. Nursing Outlook, 11, 828-831.

Sandroff, R. (1979). A skeptics guide to therapeutic touch. RN, 1, 25-30.

Schacter, S. (1966). The interaction of cognitive and physiological determinants of emotional state. In C.D. Spielberger (Ed.), Anxiety and behavior. New York: Academic Press.

Schwartz, G.E. (1977). Biofeedback and patterning of autonomic and central processes: CNs cardiovascular interactions, in Swartz, G., & Beatty, J. (Eds.): Biofeedback: Theory and Research. New York: Academic Press. pp. 183-219.

Scull, C.W. (1945). Massage - physiologic basis. Archives of Physical Medicine, 26, 159-167.

Selye, H. (1956). The stress of life. New York: McGraw-Hill Book Co.

Sims, S. (1986). Slow stroke back massage for cancer patients. Nursing Times, 82(13), 47-50).

Sivadon, P. (1969). Social and mileau therapy. In M.H. Lader (Ed.), Studies of Anxiety. London: Headley Brothers Ltd. pp. 131-134.

Smith, M.J. (1972). Paranormal effects on Enzyme activity through having on of hands. Human Dimensions, Spring(1), 15-19.

Smith, R.B. (1973). Fontalis muscle tension and personality. Psychophysiology, 10, 311-312.

Special Commissioners of the British Medical Journal. (1894). The scandals of massage. The British Medical Journal, 11, 1003-1004, 1069-1070, 1140-1141.

Spielberger, C.D. State-Trait Anxiety Inventory: A comprehensive bibliography. Palo Alto, CA: Consulting Psychologists Press.

Spielberger, C.D. (1966). Theory and research on anxiety. In C.D. Spielberger (Ed.), Anxiety and behavior. New York: Academic Press.

Spielberger, C.D. (1972). The nature and measurements of anxiety. In C.D. Spielberger (Ed.), Anxiety: Current trends in theory and research. New York: Academic Press.

Spielberger, C.D., Gorsuch, R.L. & Lushene, R.E. (1970). STAI Manual Palo Alto: Consulting Psychologists.

Stoyva, J. & Budznski, T.H. (1974). Cultivated low arousal - antistress response? In L.V. DiCara, T.X. Barber, J., Kamiya, N.E., Miller, D. Shapiro, J. Stoyva (Eds.), Biofeedback and Self-Control. Chicago: Aldine Publishing Co.

Temple, K.C.D. (1967). The back rub. American Journal of Nursing, 67, 2102-2103.

Wallace, R., Benson, H., & Wilson, A. (1971). A wakeful hypometabolic state. American Journal of Physiology, 221, 795-799.

Watson, J. (1981). The lost art of nursing. Nursing Forum, 10(3), 245-249.

Watson, W.H. (1975). The meaning of touch: Geriatric Nursing. Journal of Communication, 25(3), 104-112.

Weiss, S.J. (1979). The language of touch. Nursing Research, 28(2), 76-79.

Whanger, A.D. (1973). The stress of life. New York: McGraw-Hill Book Co.

Wilkinson, M. (1978). A re-examination of some assumptions of somatic psychotherapy. Unpublished Master's thesis, University of Alberta, 1978.

Wilson, H.S. (1985). Research in Nursing. Addison-Wesley Publishing Company: California.

Wolpe, J. (1969). The practice of behavior therapy. New York: Pergamon.

Wood, E.C. (1974). Beard's Massage: Principles and Techniques. Philadelphia: WB Saunders Co.

Zeefron, L. (1975). The history of the laying on of hands in nursing. Nursing Forum, 15, 350-363.

Appendix A

SHORT PORTABLE MENTAL STATUS QUESTIONNAIRE (SPMSQ)

Following are ten questions. If the person accurately answers the question, a score of 1 is given for that question. The total score is summed and tabulated from a total of 10. Read each question carefully and allow the respondent time to answer. Jot down the respondents answer to allow for verification of scoring.

PATIENT NAME:________________________ NUMBER: __________

		Score
1.	What is the date today? ________________________ Month Day Year	____
2.	What day of the week is it? ________________________	____
3.	What is the name of this place? ________________________	____
4.	Where is it located? ________________________	____
5.	How old are you? ________________________	____
6.	When were you born? ________________________	____
7.	Who is the Prime Minister of Canada? ________________________	____
8.	What was Prime Minister just before him? ________________________	____
9.	What was your mother's maiden name? ________________________	____
10.	Subtract 3 from 20 and keep subtracting 3 from each new number, all the way down. ________________________	____
	Total score:	____

Date: ____________________ Investigator: ____________________

Appendix B

SELF-EVALUATION QUESTIONNAIRE

Developed by C. D. Spielberger, R. L. Gorsuch and R. Lushene

STAI FORM X-1

NAME ________________________ DATE ____________

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *feel* right now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	①	②	③	④
2. I feel secure	①	②	③	④
3. I am tense	①	②	③	④
4. I am regretful	①	②	③	④
5. I feel at ease	①	②	③	④
6. I feel upset	①	②	③	④
7. I am presently worrying over possible misfortunes	①	②	③	④
8. I feel rested	①	②	③	④
9. I feel anxious	①	②	③	④
10. I feel comfortable	①	②	③	④
11. I feel self-confident	①	②	③	④
12. I feel nervous	①	②	③	④
13. I am jittery	①	②	③	④
14. I feel "high strung"	①	②	③	④
15. I am relaxed	①	②	③	④
16. I feel content	①	②	③	④
17. I am worried	①	②	③	④
18. I feel over-excited and "rattled"	①	②	③	④
19. I feel joyful	①	②	③	④
20. I feel pleasant	①	②	③	④

CONSULTING PSYCHOLOGISTS PRESS
577 College Avenue, Palo Alto, California 94306

Appendix C

University of Alberta Faculty of Nursing
Informed Consent Form

Project Title: Psychophysiological effects of back massage of elderly institutionalized patients.

Investigator: Joy H. Tough, R.N., BScN.
Graduate Office, Faculty of Nursing Clinical Sciences Building, University of Alberta, Edmonton, Alberta. T6G 2G3
(Home phone no.: 436-8152).

Research Supervisor: Dr. Janet Kerr, Professor
Faculty of Nursing
3-107 Clinical Sciences Building, University of Alberta
Phone no.: 432-6253.

Purpose of the study: The purpose of this study is to investigate the effects of back massage on elderly patients. It is anticipated that the results of this study will help nurses use back massage more effectively. It is also anticipated that this study will provide groundwork for more research in this area.

Consent: This is to certify that I, (name) have had the study outlined above explained to me. I have been told that the study does not involve any treatment which is not normally used in hospitals. I understand that I will not be placed at any risk.

I recognize that I am not obligated to participate in the study, and my care will not suffer in any way if I refuse. If I do participate, it is with the full understanding that I may withdraw at any time.

I understand that I will remain anonymous in any research reports resulting from this study, and that any identifying information will be kept in a locked file by the researcher. This information will be destroyed at the end of the study.

It has been explained to me that if I wish to know the final results of the study, the researcher may be contacted through the Faculty of Nursing at the University of Alberta. I have been given the opportunity to ask whatever questions I desire of the researcher, and have had them answered to my satisfaction.

I understand the purpose of the study and the conditions under which it will take place, and I agree to participate.

Date:________________ ________________________________(signature)
________________________________(witness)
________________________________(researcher)